REPORT RESUMES

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EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHIA. FINAL REPORT.
BY- DILLON, ROY D. AND OTHERS
MOREHEAD STATE UNIV., KY.
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EMPLOYMENT OPPORTUNITIES AND AGRICULTURAL COMPETENCIES NEEDED BY NONFARM WORKERS IN THE APPALACHIA REGIONS OF KENTUCKY AND OHIO WERE IDENTIFIED AND COMPILED. SPECIAL EMPHASIS WAS PLACED ON DETERMING THE POST-HIGH SCHOOL EDUCATIONAL CURRICULUMS NEEDED TO PREPARE WORKERS IN AGRICULTURAL, TECHNICIAN-LEVEL OCCUPATIONS. SOME GENERAL CONCLUSIONS DERIVED FROM THE COLLECTED DATA WERE THAT (1) 40 PERCENT OF ALL WORKERS EMPLOYED IN NONFARM AGRICULTURAL BUSINESSES NEED SOME KNOWLEDGE AND SKILLS IN AGRICULTURE, AND (2) 2 1/2 TIMES MORE AGRICULTURAL VOCATIONAL WORKERS THAN AGRICULTURAL TECHNICIANS WILL BE NEEDED IN THE NEXT 5 YEARS. (GD)

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Final Report

EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHIA

RESEARCH STAFF

Roy D. Dillon, Associate Professor, Project Director
Paul S. Cain, Assistant Professor, Associate Investigator
Sherrill Callahan, Graduate Assistant
Edmund Hartman, Graduate Assistant
Dwight Johnson, Graduate Assistant
John Hall, Research Assistant
David McCall, Research Assistant
Kenneth Rase, Research Assistant
John Richards, Research Assistant
Frank Rolph, Research Assistant
Charles Salisbury, Research Assistant
George Smalley, Research Assistant
Homer Thompson, Research Assistant
Clyde Whitt, Jr., Research Assistant
Rebecca Blair, Project Secretary
Bernice Carastro, Project Secretary
Marsha Johnson, Project Secretary
Janice Pasquerella, Project Secretary

PROJECT SPONSORS

School of Applied Sciences and Technology
Morehead State University

And

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The Special Consultants for the study:

Dr. Lloyd J. Phipps, Chairman, Agricultural Education, Vocational and Technical Education Department, College of Education, University of Illinois, Urbana, Illinois
Dr. Glenn Z. Stevens, Professor, Department of Agricultural Education, Pennsylvania State University, University Park, Pennsylvania
Dr. E. Grant Youmans, Department of Rural Sociology, University of Kentucky, Lexington, Kentucky
Mr. Raymond Morgan, Department of Economic Security, Frankfort, Kentucky

The Advisory Committee for the study:

Mr. D. E. Bayless, District Supervisor in Agricultural Education, Morehead, Kentucky
Mr. Fred Chumbler, Jr., Teacher of Vocational Agriculture, Mason County High School, Maysville, Kentucky
Dr. C. Nelson Grote, Dean, School of Applied Sciences and Technology, Morehead State University, Morehead, Kentucky
Dr. Carl Lamar, Director, Kentucky Research Coordinating Unit, College of Education, University of Kentucky, Lexington, Kentucky
Dr. Charles Pelfrey, Chairman of Faculty Research Committee, Morehead State University, Morehead, Kentucky
Mr. Adron Razor, Farm Advisor, Agricultural Extension Service, Rowan County
Mr. Paul D. Thompson, Manager Division of Employment Service, State Department of Economic Security, Morehead, Kentucky

The Morehead State University Staff:

Dr. Adron Doran, President
Dr. Morris Norfleet, Director of Research and Program Development
Mr. William Mahaney, Supervisor, Data Processing Section
Mr. Robert Stokes, Assistant Business Manager
Dr. William Keller, Business Program

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CHAPTER I

INTRODUCTION TO THE STUDY

Statement of the Problem

The study was undertaken in order to determine the employment opportunities and agricultural competencies needed by workers in present and emerging non-farm agricultural occupations in a thirty-eight county area in the Appalachian region. The specific objectives of the study were:

1. To identify the present and emerging jobs in industries and businesses that serve agriculture in selected counties in the Appalachian region.

2. To determine the employment opportunities for the jobs indentified.

3. To determine competencies required for a selected number of these jobs.

4. To determine the needed additional post-high school educational programs to prepare workers to enter or progress in these jobs.

5. To determine feasible procedures for implementing the development of educational programs at the post-high school level, for selected clusters of occupations where the data collected indicates that programs are needed.

6. To prepare the way for establishing and evaluating pilot programs at the high school level and at the post-high school level.

The Definitions

The terms and phrases used in the study were defined carefully as the research progressed, and are imperative for the proper impact of the results:

1. Business: a firm listed in the "yellow pages" of a telephone directory, and which provides one or more of the following functions:

    a) Manufacturing
    b) Purchasing
    c) Service
    d) Constructing
    e) Retailing
    f) Warehouse

   g) Processing
   h) Wholesaling
   i) Contractor

2. Code 1 Business: businesses which are agriculturally oriented non-farm agricultural businesses, and are operationally defined as businesses that:

   a) Produce products used in the production of many celled plants and animals.
   b) Provide services relating to the production of many celled plants and animals.
   c) Conduct research relating to the production of many celled plants and animals.
   d) Provide services relating middlemen activities between production and processing.
   e) Serve the needs unique to the producers of many celled plants and animals, and the workers in other agricultural oriented businesses.

3. Code 2 Business: businesses which do not appear agriculturally oriented, but are operationally defined as non-agricultural businesses that may have workers in positions requiring knowledge usually taught formally relating to: plant science, animal science and dairy science, economics of agriculture, engineering and mechanics of agriculture, agricultural education, rural sociology, horticulture, floriculture, soils, food and dairy technology, forestry and landscape architecture.

4. Professional Worker: persons employed with four or more years of scientifically oriented education at the higher education level in such areas as medicine, animal science, veterinary science, agronomy, horticulture, agricultural engineering, chemical engineering, sociology, education, electrical engineering, and so forth.

5. Technician: a semi-professional, highly skilled worker who can be differentiated from both the professional person and the highly skilled worker. Many technicians work in a direct, supporting capacity to professional persons and scientists. Many perform tasks which either were at one time, or still continue to be within the range of the functions of professional personnel. A technician is located midway between the skilled person and the professional person in the developmental structure of jobs, in his work performance, and in his educational attainment. The jobs of most technicians may be traced to recent applications of scientific and technological knowledge in the production and distribution to goods and services. The success of a technician depends on his understanding of scientific principles and his ability to apply these scientific principles in solving problems of modern design, production, distribution, and service. (23) (25) (29)

6. Technical worker: defined as a worker who needs some post-high school technical education.

7. Vocational worker: defined as a worker who needs at least a high school education for vocational level jobs identified.

8. Vocational job title: defined as a position in a business where a worker uses knowledge and skills commonly taught at the high school level.

9. Agriculturally-oriented job: a position of employment in which the worker uses knowledge and skills usually taught formally relating to:

   a) Plant science
   b) Animal science and dairy science
   c) Economics of agriculture
   d) Engineering and mechanics of agriculture
   e) Agricultural education
   f) Rural sociology
   g) Horticulture
   h) Floriculture
   i) Soils
   j) Food and dairy technology
   k) Forestry
   l) Landscape architecture

10. Technical job title: defined as a position in a business where the worker uses knowledge and skills at the technician level in performing his job.

11. Agricultural technical job: defined as a position of employment where a worker uses agriculturally oriented knowledge and skills at the technician level, in performing his job.

Review of Selected Literature

In recent years there has been an increasing shortage of trained workers and the need for strengthening certain phases of education. One of the areas of greatest need for trained workers and improved training is the area of vocational and technical education.

Increased agricultural production and increased consumption of agricultural products have resulted in a vast new area of opportunities in non-farm agricultural occupations. These opportunities lie chiefly in the field of marketing and processing agricultural products, in supplying equipment and technical services to farmers, and in providing professional agricultural services(2) Three times as many workers are employed in these off-farm agricultural occupations as are employed in farming. Therefore, in addition to opportunities in farming, opportunities exist in increasing numbers in the field of agriculture. These non-farm agricultural occupations require an increasing amount of technical and professional training. Need for untrained workers is decreasing in agriculture just as in other technical fields.

In vocational-technical education, several global studies have been completed to determine employment opportunities and abilities needed by workers in non-farm agricultural jobs. These studies indicate that: (1) jobs can be indentified by analyzing what the worker does, (2) much technical education belongs at the post-high school level because of the difficulty and complexity of the instruction and the maturity of the student. (1)(4)(5)(6)(7)(8)(9)(10)(11)(12) (14)(15)(16)(19)(26)(27)(28)

Kennedy concluded in his study of job requirements in twenty-five agricultural occupations that educational programs: (1) should provide for differing levels and areas of training, (2) should recognize vertical mobility, (3) should be based on what the worker actually does. (20) He suggested that curriculms be built around specific occupations or on a planned course sequence.

Courtney, in his comparison of knowledge and experience levels needed by workers in three agricultural occupations, pointed out that if the "centrifugal" approach was used, both farmers and workers in non-farm agricultural occupations could be served by a single course, (13) Such a course would contain knowledges and experiences common to both groups.

According to the United States Department of Agriculture Economic Research Service, attention needs to be focused on special problems to prepare farm and other youth for productive non-farm agricultural careers. Present data from the Kentucky Department of Commerce indicates that the job titles listed in the countries selected deal only with jobs in production agriculture. The Kentucky Bureau of Economic Security indicates that if attention is focused on the employment opportunities in non-farm agricultural jobs, the out-mobility of rural residents should decrease (3). This would strengthen the Kentucky program of agricultural expansion, which includes new goals for production agriculture and in jobs associated with agriculture. According to 1960 Census of Population, median family income in one-half of the proposed counties in eastern Kentucky was $1,056 to $2,708 yearly, and from $2,708 to $3,516 for the remaining one-half of the proposed counties in Kentucky. (2)

Statewide studies completed concerning present and future workers needing agricultural competencies also indicate that:

1. Almost one-half of all workers employed in off-farm agricultural businesses need some knowledge or skills in agriculture.

2. There was an estimated median increase of four per cent per year in the number of workers needing agricultural competencies.

3. Hiring of replacement workers is largest in businesses that have the most part-time workers.

4. Vocational agriculture may support, or be supported by, other vocational and technical subjects taught in the comprehensive high school and post-high school institutions.

5. Employers seem unwilling to hire employees under about 20 years of age. Additional education beyond high school seems logical in order to fill the gap.

6. Employers have not had the experience of hiring beginning employees with post-high school education required. In states where a higher amount of technical education above high school is being provided, the per cent of employers requiring this type experience is greater.

7. There will be an increase in the hiring of persons with more than a high school education for entry level positions.

8. Advancement within an occupation required a higher average level of competency than was required to gain initial entry.

9. It is possible to determine the competencies needed for entry and advancement, and to group these competencies into clusters so that common and specialized courses may be offered for groups of jobs having similiar educational requirements. (17) (18) (24)

CHAPTER II

THE PROCEDURE FOR CONDUCTING THE STUDY

The General Design

The general design of the study was an interview-survey procedure, where trained workers contacted businesses in random samples of:

1. Non-farm agricultural businesses in the region of study.
2. Non-agricultural businesses in the region of study that may have workers who require agricultural knowledge and skills.

Sampling Procedure

The region of study, or universe, was designated as a thirty-eight county area; twenty eight eastern Kentucky counties and ten southern Ohio counties, including the service region of Morehead State University. The counties are listed below, and are shown in Figure 1 and Figure 2.

Kentucky

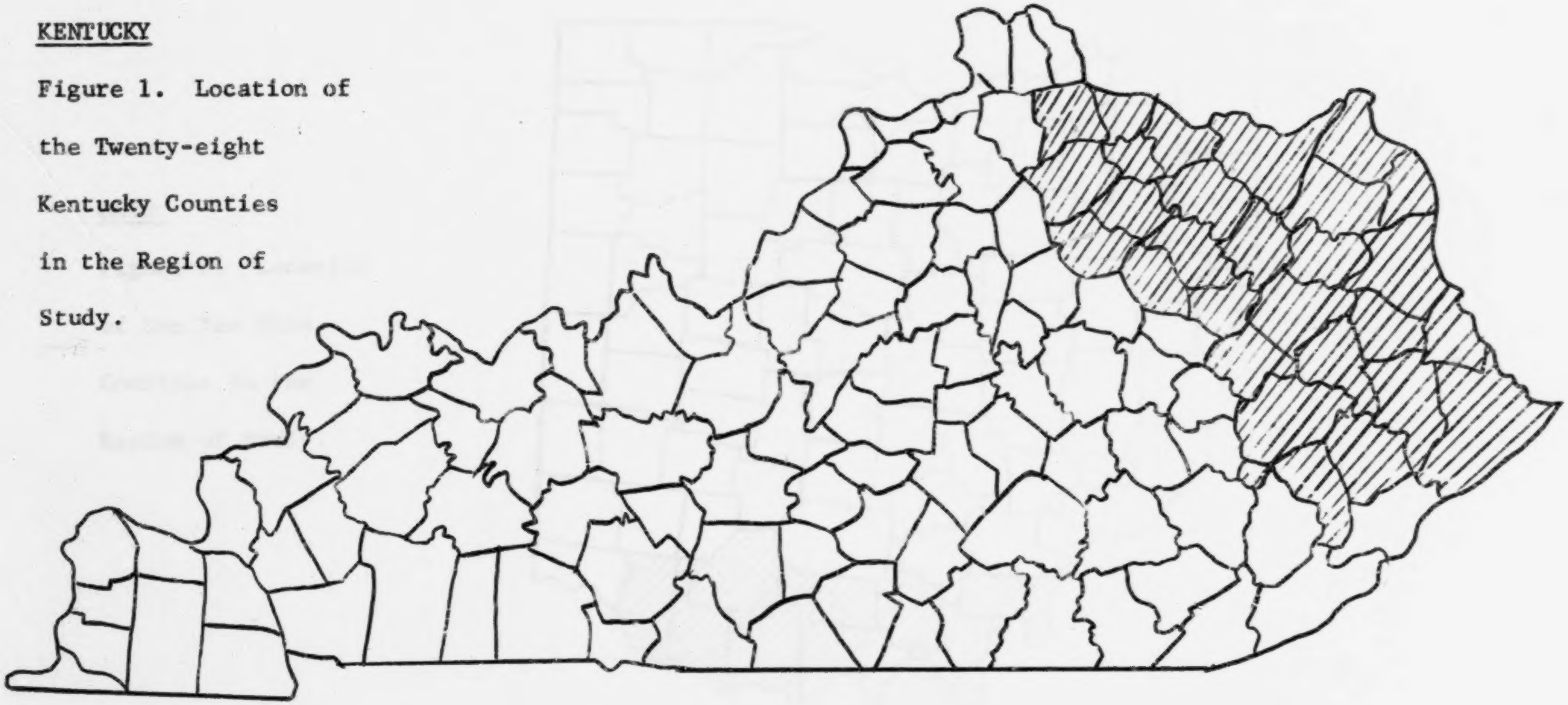
Bath
Bourbon
Boyd
Bracken
Breathitt
Carter
Elliott
Fleming
Floyd
Greenup
Harrison
Johnson
Knott
Lawrence
Lewis
Magoffin
Martin
Mason
Menifee
Montgomery
Morgan
Nicholas
Pendleton
Perry
Pike
Robertson
Rowan
Wolfe

Ohio

Adams
Brown
Cleremont
Gallatin
Highland
Jackson
Lawrence
Meigs
Pike
Scioto

In order to obtain the final list of businesses to be interviewed a two-stage random-sampling technique with two-way stratification was used. The decision was made to obtain the names of businesses to be interviewed from the yellow pages of the telephone directories published by the telephone exchanges serving the area to be studied.

Since it was impossible to survey all businesses in all exchanges it was necessary to reduce the number of exchanges and business within the exchanges to a number which, it was estimated, could be surveyed within the limits of manpower and time available. This judgement was made on the basis of other studies previously completed. The step-by-step sampling procedure was as follows:

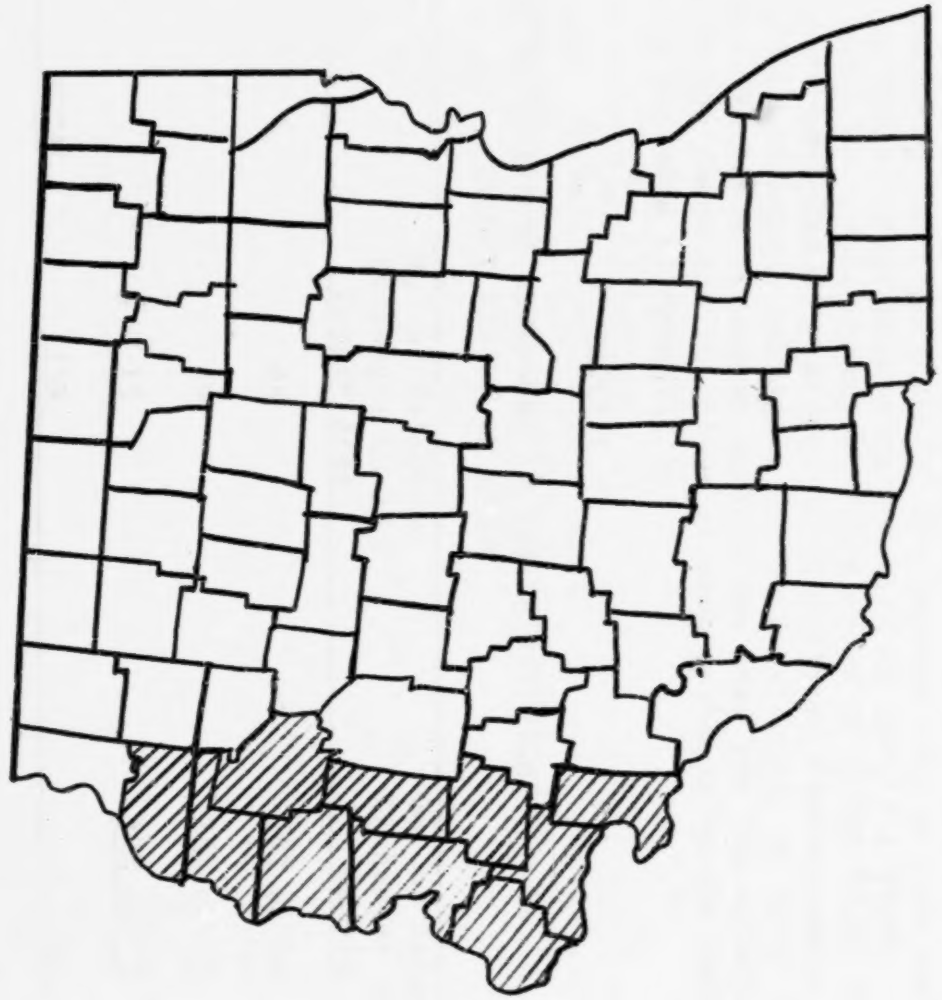


KENTUCKY

Figure 1. Location of the Twenty-eight Kentucky Counties in the Region of Study.

OHIO

Figure 2. Location of the Ten Ohio Counties in the Region of Study.



1. The names of all the telephone companies serving the thirty-eight county region of study were obtained from the State Department of Commerce in Kentucky and Ohio. The names of all the telephone exchanges serving the thirty-eight county area were then obtained from each telephone company. The 159 telephone exchanges included all the land area in the geographical region of study. The 159 exchanges were then grouped into three strata based on the population of the largest city or town served by the exchange. This procedure was used to insure a final sample which was representative of the types of firms found in rural, suburban, and city areas. A stratified random sample of forty-one telephone exchanges was then selected, as shown in Table 1. The table of random numbers was used for the selection. A list of the names and locations of each exchange in the random sample is included as Appendix A.

TABLE 1

SAMPLE OF TELEPHONE EXCHANGES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum		No. of Telephone Exchanges in 38 County Area	No. of Telephone Exchanges in the Sample
0-1000		95	25% or 24
1000-5000		49	25% or 12
5000-over		15	30% or 5
	TOTAL	159	41

2. The names of all businesses in the forty-one telephone exchanges in the sample were then obtained from the yellow page listings of the forty-one telephone directories. Where necessary they were checked against the white page alphabetical listings and with knowledgeable persons in the area such as the County Extension Agent of the Vocational Agriculture Teacher, to be sure all businesses were listed. The listing of businesses from each exchange was done within the population stratum from which it came, and this identity was retained for the remainder of the sampling. A 50 per cent sample of all businesses listed was then drawn by taking a 50 per cent sample from each telephone exchange within each of the three strata. This procedure was used to insure proportionate representation from each of the exchanges within each population stratum in the final sample, since the number of businesses in each telephone exchange and within each stratum were not equal. Table 2 shows the data for the second step. All sampling was done by use of the random numbers table.

TABLE 2

NUMBER OF BUSINESS FIRMS IN THE FIFTY-PER CENT RANDOM SAMPLE IN THREE POPULATION STRATA

Population Stratum	Total No. of Businesses	Per Cent Sampled	Number of Businesses in Sample Drawn
0-1000	625	50	313
1000-5000	1366	50	683
5000-over	2754	50	1377
TOTAL	4745		2373

3. The 2,373 businesses retained in the 50 per cent sample were divided into three categories based on the business title and yellow page heading, by stratum. The 3 categories were:

"Code 1" Non-farm agricultural businesses.

"Code 2" Non-agricultural businesses that may have workers who require agricultural knowledge and skills.

"Code 3" Those businesses not included in the above and deemed not to employ any persons requiring agricultural knowledge and skills.

A list of the yellow page headings used as guides for determining the category placement is included as Appendix B.

4. Those businesses in category "1", non-farm agricultural businesses, were further categorized into one of seven types of business to insure a cross-sectional representation of different types of non-farm agricultural businesses in the final sample. The agricultural businesses were categorized as follows:

a) Horticulture
b) Livestock
c) Crops and Soils
d) Agricultural Education
e) Agricultural Economics
f) Agricultural Engineering
g) Poultry

5. A 70 per cent sample was drawn in each of the seven types of sub-categories in code "1", non-farm agricultural businesses. In business category "2" a 10 per cent sample was drawn of the non-farm agricultural businesses with possibilities. An additional 5 per cent was drawn to provide added businesses to be interviewed if time permitted. Table 3 shows the breakdown of category "1" businesses and the number of firms drawn as the final sample to be interviewed. All sampling was done by using the table of random numbers.

TABLE 3

NUMBER OF NON-FARM AGRICULTURAL BUSINESSES IN THE FINAL RANDOM SAMPLE OF FIRMS TO BE INTERVIEWED

Population Stratum	Non-Farm Agricultural Businesses (Types)	Total Businesses	70 Per Cent Sample to be Interviewed
(1) 0-1000	Horticulture	2	2
	Livestock	18	13
	Crops - Soils	9	7
	Agr. Education	1	1
	Agr. Economics	0	0
	Agr. Engineering	6	5
	Poultry	1	1
	SUM	37	29*
(2) 1000-5000	Horticulture	9	7
	Livestock	17	12
	Crops- Soils	2	2
	Agr. Education	0	0
	Agr. Economics	0	0
	Agr. Engineering	30	20
	Poultry	1	1
	SUM	59	42*
(3) 5000-over	Horticulture	13	10
	Livestock	43	32
	Crops - Soils	9	7
	Agr. Education	0	0
	Agr. Economics	1	1
	Agr. Engineering	23	17
	Poultry	4	3
	SUM	93	70*
	TOTAL	189	141*

*This figure exceeds 70% due to rounding.

Table 4 shows the number of firms in the final sample of category "2" businesses, including the extra 5 per cent sample to be interviewed if time permitted.

The 50 per cent random sample of "Code 3 " or non-agricultural businesses was put aside at this point, for a later study.

TABLE 4

NUMBER OF NON-FARM
AGRICULTURAL BUSINESSES WITH POSSIBILITIES FOR
AGRICULTURALLY TRAINED PERSONNEL, TO BE INTERVIEWED

Population Stratum	Total Non-Agricultural Businesses With Possibilities For Agricultural Trained Personnel	10% Sample Phase I	Additional 5% Sample Phase II	TOTAL
0-1000	196	20	10	30
1000-5000	433	44	26	70
5000-over	785	79	39	118
	SUM 1414	143	75	218

Table 5 shows the composite number of firms in the sample of exchanges in each population stratum, and the number of firms in the final random sample in each stratum.

A total of 141 category (1) "non-farm agricultural businesses" and 143 category (2) "non-agricultural businesses with possibilities for agriculturally trained personnel, " were interviewed. This was a total of 284 firms.

Interviewer Training

The interviewer-training program began in May, 1965, as the staff was familiarized with the objectives of the study, the sampling procedure, the kinds of data to be collected, and the data analyses comtemplated. At the July 29-30, 1965, meeting of the special consultants, one full-day was utilized with small group sessions with research assistant participation. The special consultants were used to:

1) Discuss the proposed sampling procedures.
2) Discuss the proposed interview techniques.
3) Discuss procedures for completing the instrument.

TABLE 5

NUMBER OF BUSINESSES IN THE FORTY-ONE TELEPHONE EXCHANGES IN THE SAMPLE AND THE NUMBER OF FIRMS IN THE FINAL RANDOM SAMPLE OF FIRMS IN EACH STRATUM

POPULATION STRATUM		NUMBER OF BUSINESS FIRMS											
		TYPE OF BUSINESS NON-FARM AGRICULTURAL BUSINESS								NON AGRICULTURAL WITH POSSIBILITIES	NON AGRICULTURAL	TOTAL SAMPLE EXCHANGES	TOTAL (SAMPLE)
		Horticulture	Livestock	Crops-Soils	Ag. Ed.	Ag. Econ.	Ag. Engr.	Poultry	TOTAL				
0-	Sample Exchanges	2	18	9	1	0	6	1	37	196	80	625	313
1,000	Sample Businesses	2	13	7	1	0	5	1	29	10% = 20 15% = 30	NOT STUDIED	---	---
1,000-	Sample Exchanges	9	17	2	0	0	30	1	59	433	191	1366	683
5,000	Sample Businesses	7	12	2	0	0	20	1	42	10% = 44 15% = 70	NOT STUDIED	---	---
5,000-	Sample Exchanges	13	43	9	0	1	23	4	93	785	499	2754	1377
up	Sample Businesses	10	32	7	0	1	17	3	70	10% = 70 15% = 118	NOT STUDIED	---	---
TOTAL	Sample Exchanges	24	78	20	1	1	59	6	189	1414	770	4745	2373
	Sample Businesses	19	57	16	1	1	42	5	141	10%= 143 15%= 218	---	---	---

A draft copy of an interviewer's training manual was prepared during the early summer, and revised after the consultant's conference held in July, 1965. The final copy was coordinated with the project staff and printed just prior to the start of the interviewer training period. Several revisions were made after the pilot interviews in October, 1965. This manual served as a reference for the interviewer during the data collection phase.

Beginning about October 1, 1965, a formal training program was undertaken which included the following steps:

1. In staff meeting, a careful review was made of the best procedures to use in contacting businesses and conducting interviews. The principles of the proposed interview procedure were outlined.

2. The complete instrument and interviewer's manual were presented and incorporated into the interview training procedure.

3. A demonstration interview was given by the project staff.

4. Each prospective interviewer role-played an interview situation before the project staff. A tape recorder was used to record the interviews, and a play-back and critique was made of each person's role-play situation.

5. Each prospective interviewer role-played and recorded an interview situation before a small group of research assistants. Each person's interview was evaluated and critique held by the project staff.

6. The Morehead telephone exchange does not fall in the sample of exchanges, and was selected as the exchange for conducting of the pilot interviews. All the non-farm agricultural businesses and non-agricultural businesses with the possibilities for agricultural jobs in the Morehead, Kentucky telephone exchange, were then listed.

7. Each prospective interviewer observed an actual interview conducted by one of the staff investigators in a business in the Morehead exchange. Two research assitants were taken at one time; and after the interview, a critique was held to determine if the prospective interviewer had obtained the same data as did the staff investigator.

8. Each prospective interviewer then selected a team-mate, and each team made calls to two different firms. Each person had an opportunity to perform a pilot interview. The team-mate observed and also took data. After each team visit, a critique was held with one of the staff investigators to determine if the procedures had been effective, and if the data obtained by each member of the team indicated procedural validity.

9. A total of seventeen firms in the Morehead Telephone exchange area were visited by the prospective interviewers during the pilot interviews.

10. At the end of the training period, three staff meetings were held to evaluate and coordinate the results of the pilot interviews, and to discuss the procedural changes and practices to be made as a result of the pilot interviews. The revisions were incorporated into the interviewer's manual as amendments.

The Instrument

The final form of the instrument was completed at the end of the pilot interview phase of the training program:

The complete instrument contained three forms. The purpose of each was:

Form 1: To obtain information about the functions of each firm, the kinds and numbers of workers in present and anticipated job titles in the firm, and future employment needs.

Form 2: To obtain information about specific jobs in each firm; specifically the activities in which the worker engages, and the knowledges he uses in his job.

Form 3: To obtain a narrative description of the job, and a determination of the level of the job; i.e., laborer, semi-skilled, skilled, technical, semi-professional, professional.

A copy of the instrument is included as Appendix C.

The Data Collection

Beginning November 1, 1965, the field data was collected by a nine-member research assistant team, who made personal contacts with each of the 284 business firms in the final random sample. A total of 15,414 miles was driven by the interviewers during this phase of the project.

After the data were obtained, the raw-data forms were carefully coded, and checked. All the data were then punched onto IBM cards by the research assistant staff. The cards were visually verified and a card sort was made, by column, on all decks to insure that the correct coding procedure had been used. The coding procedure is included as Appendix D. The data for the 736 job positions identified were carefully evaluated by the project staff. Using the data obtained on each job position, the raw data form was given a descriptive title which best reflected the worker's function. An additional purpose was to consolidate titles for more effective data analysis purposes. The list of descriptive job titles is included as Appendix E.

CHAPTER III

ANALYSIS OF THE DATA

Identification of Present and Emerging Jobs

Data were obtained on a total of 736 job positions in the 284 businesses in the total sample. These 736 job positions represented 267 different descriptive job titles, and are listed in Appendix E.

Of the 736 positions, 306 job positions were defined as agriculturally-oriented jobs, and represented 126 different vocational and technical job titles. These 126 titles are included as Appendix F.

Of the 126 different agriculturally-oriented job titles, 67 titles were defined as agricultural-technician job titles. There 67 different job titles are included as Appendix G.

Employment and Employment Opportunities for Agricultural Workers Identified

Total Number of Workers Currently Employed

Estimates of total number of workers indicate that there were 122,440 workers (Table 6) employed in business firms in the thirty-eight county region of study. This estimate pertains to workers employed in Type 1 and Type 2 businesses only. Workers in agricultural businesses (Type 1) constitute about 10 per cent of the total workers, with 71.1 per cent of the agricultural workers employed in Type 2 firms.

As shown in Table 7, of the 284 business firms contacted, 146 firms had one or more jobs requiring the use of agricultural knowledge and skills. It was estimated that 4531 businesses in the region of study employ agricultural workers.

Table 7 also emphasizes the importance of the Type 2 businesses as a source of employment for workers who use specialized agricultural knowledge and skills. Estimates indicate that 80 per cent of the businesses in the universe which employ workers needing agricultural knowledge and skills were Type 2 businesses.

Number of Workers Currently Employed in Agriculturally-Oriented Jobs

As shown in Table 8 it was estimated that there were 11,752 persons employed in agriculturally-oriented jobs in the region of study. These workers were defined as needing agricultural knowledge and skills at a vocational or technical level in performing their jobs.

Of the total workers in agriculturally-oriented jobs, it was estimated that 3359 were technical level workers and 8343 were vocational level workers.

TABLE 6

ESTIMATES OF THE TOTAL NUMBER OF WORKERS EMPLOYED IN TYPE 1 AND TYPE 2 BUSINESSES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Workers In Sample	In Universe	Per Cent
Strata 1			
Type 1	174	1776	1.5
Type 2	81	6480	5.3
	255	8256	
Strata 2			
Type 1	199	2232	1.8
Type 2	216	17280	14.1
	415	19512	
Strata 3			
Type 1	855	7559	6.2
Type 2	1308	87113	71.1
	2163	94672	
Totals	2,833	122,440	100.0

TABLE 7

ESTIMATES OF THE TOTAL NUMBER OF BUSINESS FIRMS HAVING WORKERS WHO REQUIRE VOCATIONAL AND TECHNICAL AGRICULTURAL EDUCATION, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Workers In Sample	In Universe	Per Cent
Strata 1			
Type 1	24	244	5.4
Type 2	7	560	12.4
	31	804	
Strata 2			
Type 1	29	324	7.1
Type 2	16	1280	28.3
	45	1604	
Strata 3			
Type 1	44	390	8.6
Type 2	26	1733	38.2
	70	2123	
Totals	146	4531	100.0

TABLE 8

ESTIMATES OF NUMBERS OF WORKERS IN
AGRICULTURALLY ORIENTED JOBS IN THE
THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Workers		
	In Sample	In Universe	Per Cent
Strata 1			
Type 1	89	912	7.8
Type 2	9	720	6.1
	98	1632	
Strata 2			
Type 1	97	1088	9.3
Type 2	17	1360	11.6
	114	2448	
Strata 3			
Type 1	295	2611	22.2
Type 2	76	5061	43.0
	371	7672	
Totals	583	11,752	100.0

Number of Agricultural Technicians Currently Employed

After careful inspection of the interview data, 122 different agricultural job titles were identified in which some degree of technical-education was required. These 122 job titles included 190 agricultural technicians currently employed. The knowledges required to perform their job activities, and the responsibilities associated with their activities clearly indicated effective job performance at the time of employment could be expected only if the workers had obtained a level of technical education beyond high school.

It was found that 40 businesses of the 284 surveyed had positions which required people defined as agricultural technicians. The detailed information obtained for these positions was given by people active in the work and management of the companies contacted and should accurately reflect how the worker uses knowledge and skills in performing his job. Table 9 shows that 57.5 per cent of the people interviewed were owners while 27.5 per cent were managers. All of these companies were small enough so that the owner or manager had first-hand knowledge of the requirements of each position and knew the workers occupying the position. Table 9 shows the position of the person interviewed in the 40 businesses having agricultural technicians.

TABLE 9

PERSONS INTERVIEWED, BY POSITION IN COMPANY, IN THE 40 BUSINESSES FROM WHICH DETAILED AGRICULTURAL TECHNICAL JOB INFORMATION WAS OBTAINED

Position in Company	Number	Per Cent
Owner	3	7.5
Owner-Manager	20	50.0
Manager, hired	10	25.0
Manager, sales	0	0.0
Manager, office	1	2.5
Personnel director	0	0.0
Other	6	15.0
	40	100.0

As shown in Table 10, it was estimated that 3359 agricultural technicians were currently employed in the 2351 business firms indentified in the region of study.

It should be noted that less than 50 per cent of the agricultural technicians were currently employed in Type 1 businesses. This indicates the importance of potential job openings in Type 2 businesses for persons trained in agricultural skills and with agricultural knowledge.

Functions of the Businesses Studied

The data in Table 11 show that: (1) purchasing was the predominant function of 40 firms studied that hire agricultural technicians, and (2) that many of the businesses performed more than one function.

The servicing and retailing functions were provided by 18 and 15 respectively of the 40 businesses studied.

TABLE 10

ESTIMATED NUMBER OF AGRICULTURAL TECHNICIANS CURRENTLY EMPLOYED IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Technicians In Sample	Number of Technicians In Universe
Strata 1		
Type 1	19	192
Type 2	1	80
	20	272
Strata 2		
Type 1	37	416
Type 2	4	320
	41	736
Strata 3		
Type 1	108	952
Type 2	21	1399
	129	2351
Totals	190	3359

TABLE 11

FUNCTIONS OF THE 40 BUSINESSES FROM WHICH DETAILED JOB INFORMATION WAS OBTAINED ON AGRICULTURAL TECHNICIANS

Function of Businesses	Number of Firms Having Each Function	Per Cent Having Each Function
Construction	2	5.0
Contracting	5	12.5
Manufacturing	1	2.5
Processing	12	30.0
Purchasing	22	55.0
Retailing	15	37.5
Servicing	18	45.0
Warehousing	8	20.0
Wholesaling	12	30.0
Other	4	10.0

Additional Agricultural Technicians Needed

The employers were asked how many different persons had been employed in each job defined as an agricultural-technician job over the past five years, in an effort to estimate employee turnover. Table 12 shows there had been a turnover of 12,017 agricultural technicians in the last five years in the region of study.

TABLE 12

ESTIMATES OF THE NUMBER OF AGRICULTURAL TECHNICIANS
EMPLOYED IN THE LAST 5 YEARS
IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Technicians		
	In Sample	In Universe	Per Cent
Strata 1			
Type 1	117	1192	9.9
Type 2	6	480	4.0
	123	1672	
Strata 2			
Type 1	100	1120	9.3
Type 2	20	1600	13.3
	120	2720	
Strata 3			
Type 1	230	2031	16.9
Type 2	84	5594	46.6
	314	7625	
Totals	557	12,017	100.0

Employers were also asked to estimate the number of additional workers that would be needed in the next three years and within the next five years due to business growth and employee turnover. According to the data in Tables 13 and 14, the number of additional agricultural technicians needed in the next 3 and 5 year period will be 1155 and 1591 respectively. The 5 year estimate includes the 3 year estimate.

Table 12 clearly shows that the number of agricultural technical workers employed in the past 5 years is considerably larger than the number expected to be needed in the next 3 and 5 year period. This larger number probably reflects business growth, employee turnover, promotions, retirement, lack of educational participation, and a certain satisfaction with workers currently employed. It is also likely that the employer responded to the interviewer's question about workers needed in the future primarily in terms of new workers needed for expansion and did not include the anticipated turnover, retirement, and promotions. The investigators believe it is safe to assume that the actual need for agricultural technicians will approach the proportion employed in the last 5 years. This rationale is based upon more than the numerical information collected, and was an impression obtained which was unqualified, but helps explain the quantified data. There was no data obtained on the inter-group cycling of workers, but this is not assumed to be large since the trend in the Appalachian is for skilled workers to move out of the area to more lucrative positions elsewhere.

As shown in Tables 12 and 13, estimates also indicate that a relatively small number of the positions are open on a part-time basis, and constitute less than 10 per cent of the agricultural technician positions to be filled in the next 3 and 5 year period.

TABLE 13

ESTIMATES OF THE NUMBER OF ADDITIONAL AGRICULTURAL TECHNICIANS NEEDED IN THE NEXT 3 YEARS IN TYPE 1 AND 2 BUSINESSES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Agricultural Technicians			
	In Sample		In Universe	
	Full time	Part time	Full time	Part time
Strata 1				
Type 1	0	0	0	0
Type 2	0	0	0	0
Strata 2				
Type 1	9	3	104	32
Type 2	2	0	160	0
Strata 3				
Type 1	37	0	326	0
Type 2	7	1	466	67
Totals	55	4	1056	99
		Total	1155	

TABLE 14

ESTIMATES OF THE NUMBER OF ADDITIONAL AGRICULTURAL TECHNICIANS NEEDED IN THE NEXT 5 YEARS IN TYPE 1 and 2 BUSINESSES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Agricultural Technicians			
	In Sample		In Universe	
	Full time	Part time	Full time	Part time
Strata 1				
Type 1	0	0	0	0
Type 2	1	0	80	0
Strata 2				
Type 1	11	3	120	32
Type 2	2	0	160	0
Strata 3				
Type 1	53	0	466	0
Type 2	10	1	666	67
Totals	77	4	1492	99
		Total	1591	

Educational Requirements

At the time of the study, agricultural job titles requiring workers with technical education were being filled with persons who did not possess at time of employment the level of education required for effective job performance. Based on the opinion of employers interviewed, as shown in Table 15, it was estimated that the number of persons classified as agricultural technicians for whose job schooling beyond the high school level was required, was 746. This was about 25 per cent of the total estimated workers classified by definition as agricultural technicians. The interviewers reported that employers indicated a high percentage of the agricultural technicians presently employed were trained on-the-job, and that employers based their opinions on the past experience of hiring a vocational level person and training him on the job for technical level responsibilities. Table 16 shows that nearly 35 per cent of the 190 agricultural technicians employed at the time of the study would be replaced with persons possessing no post-high school education.

The employers' opinions reflected their experiences based on the types of educational programs in existance and the characteristics of the labor force at the time of the study. It has been shown in earlier studies that in states where trained technical workers were available, positions were available for them. Employers in the thirty-eight county region of study have historically not had trained persons available to them.

TABLE 15

AGRICULTURAL TECHNICIANS WHO NEED POST-HIGH SCHOOL EDUCATION ACCORDING TO THE PERSON INTERVIEWED

Population Stratum and Type of Business	Number of Technicians					
	In Sample			In Universe		
	More than 12 yrs.	College Degree	Per Cent	More than 12 yrs.	College Degree	Per Cent
Strata 1						
Type 1	5	0	6.4	48	0	
Type 2	1	0	10.7	80	0	
Strata 2						
Type 1	3	0	4.3	32	0	
Type 2	1	0	10.7	80	0	
Strata 3						
Type 1	8	11	9.8	73	100	13.4
Type 2	4	1	35.7	266	67	9.0
	22	12		579	167	
				746		100.0

TABLE 16

LEVEL OF EDUCATION REQUIREMENTS OF REPLACEMENTS FOR 190 AGRICULTURAL TECHNICIANS EMPLOYED IN 122 TECHNICAL JOBS BY TYPES OF BUSINESS

Employers Opinion Regarding Level of Education Required	TYPE OF BUSINESS			
	1		2	
	No. of Workers	PerCent	No. of Workers	PerCent
Secondary Education or less	121	73.7	16	61.5
Post Secondary Education	43	26.3	10	38.5
TOTAL	164	100.0	26	100.0

If trained technical workers were available, employers indicated they would rather hire and pay a higher wage to a trained technical-level person rather than train a vocational-level worker for technical-level responsibilities.

It was estimated that 2667 workers will be needed in the next five years in the job titles defined as agriculture technicians, in the region of study. This estimate is based primarily on business growth, and would be about 525 per year. If we examine the number of agricultural technicians needed during the same period based on employee turnover data we find that 2400 agricultural technicians are needed per year. Therefore, more than 500, but not more than 2400 can be estimated as a realistic goal in establishing educational programs.

Work Experience Requirements

Most agricultural technicians and other technical workers needing technical education must prepare for effective job performance by gaining work experience prior to employment, through formal training on the job, or both. As shown in Table 17, approximately 90.5 per cent of all future agricultural technicians would be required by employers in Type 1 and Type 2 businesses to possess work experience prior to employment, obtain on-the-job training after employment, or both. However, well planned post-high school educational programs should contain work experiences which would shorten the on-the-job training period.

TABLE 17

WORK EXPERIENCE REQUIREMENTS OF REPLACEMENTS FOR 190 AGRICULTURAL TECHNICIANS IN 122 TECHNICAL JOBS, BY TYPE OF BUSINESS

Employer's opinions regarding work experience requirements	TYPE OF BUSINESS 1		2	
	No. of Workers	Per Cent	No. of Workers	Per Cent
Work experience prior to employment, formal on-the-job training, or both	152	92.6	23	88.4
No work experience	12	7.4	3	11.6
TOTAL	164	100.0	26	100.0

Age Limitations

Age limitations other than those established by law or insurance regulations do not appear to be a major concern of the employers. Employers indicated that a special age requirement was a specific criterion for employment for approximately 115 of the agricultural technicians, as shown in Table 18.

TABLE 18

MINIMUM AGE LIMITATIONS FOR INITIAL EMPLOYMENT OF REPLACEMENTS FOR 190 AGRICULTURAL TECHNICIANS

Employer's opinion regarding special age limitations	TYPE OF BUSINESS			
	1		2	
	No. of Workers	Per Cent	No. of Workers	Per Cent
Limitations specified	94	57.8	21	80.7
None specified	70	42.2	5	19.3
TOTAL	164	100.0	26	100.0

The data showed that age requirements were most often related to the problem of obtaining workers who needed a certain degree of maturity and experience. Three major age ranges were identified, as shown in Table 19. The most frequently mentioned minimum age ranges for initial employment fell between 18-24 and 25-36.

TABLE 19

MINIMUM AGE RANGE FOR INITIAL EMPLOYMENT OF REPLACEMENTS FOR AGRICULTURAL TECHNICIANS IN JOBS WITH AGE LIMITATIONS

Employer's opinion regarding minimum age range for initial employment	TYPE OF BUSINESS			
	1		2	
	No. of Workers	Per Cent	No. of Workers	Per Cent
18-24	57	34.8	12	47
25-30	10	6.0	2	7.6
31 or above	2	1.2	1	.4
No specification	95	58.0	11	45
TOTAL	164	100.0	26	100.0

Determination of Principal Axis Factors For Activities and Knowledges

Since the primary emphasis in the study was to be on jobs requiring agricultural knowledge and skills, it was decided by the investigators that the analyses pertaining to competencies needed would be performed with the 306 agriculturally-oriented job positions on which data had been gathered.

At the time each employer who was interviewed furnished information about present and future employees in each job title in the business, a checklist of activities and knowledges was completed seperately for each job title. For each item on the checklist (a total of 92 items) the employer noted the degree to which the worker performed the activity or used the knowledge in his job, on a three-point scale:

0 = Does not perform the activity or utilize the knowledge in his job.

1 = Performs the activity or utilizes the knowledge "some" or "little" in his job.

2 = Performs the activity or utilizes the knowledge "much" or "often" in his job.

A list of the 92 activity and knowledge variables is shown in Appendix C.

A factor analysis with varimax rotation technique was performed using the IBM 7040 Computer, using the data on the 92 activity and knowledge variables for the 306 agriculturally-oriented job positions. Fifteen factors or "clusters" were identified, with variance accounted for of 63.57 per cent. The fifteen factors which emerged were groupings of competencies with high "factor loadings", and can be translated into major course content areas:

#1. Personnel Supervision and Business Management

Appraising work of others
Supervising others
Handling men
Inducting new personnel
Training others
Policy-making
Decision-making
Planning
Buying
Taxes
Selecting
Planning production or service
Calculating costs
Inventorying

#2. Mechanical Science and Technology

Adjusting
Repairing
Maintaining
Inspecting, testing, trouble shooting
Operating
Calibrating
Assembling
Installing
Remodeling
Testing
Mixing
Inspecting
Using technical & service manuals, parts lists

#3. Animal Science

Feeds
Animal Nutrition
Livestock
Dairy
Poultry
Animal Diseases
Rural Recreation

#4. Sales and Business Skills

Selling
Meeting non-farm people
Handling money
Promoting
Salesmanship
Meeting farm people
Keeping records and accounts
General agriculture and rural life knowledge
Estimating costs

#5. Plant and Soil Science

Soils
Plant Diseases
Soil and water management
Horticulture
Agricultural chemicals
Insect and pest control
Crops
Floriculture

#6. Physical Science Technology

Metallurgy
Electronics
Sound and light
Mechanics
Hydraulics

#7. Technical and Business Communications

Making speeches
Writing articles and copy
Making technical reports
Developing techniques
Reading technical reports

#8. Agricultural Mechanics

Farm mechanization
Farm conveniences
Tractors and other power units
Agricultural economics
Shop work

#9. Building Design and Construction Technology

Making and building
Designing
Constructing
Assembling

#10. Business Operation

Business principles
Office procedures
Accounting
Credit
Insurance

#11. Farm Building Technology

Farm buildings
Electricity

#12. Food Processing

Food processing

#13. Architectural Technology

Architecture
Sketching & drawing
Carpentry
Forestry

#14. Physical Science Research

Research procedures
Physics
Conducting research
Chemistry

#15. Mathematics

Advanced mathematics

The data for each of the fifteen activity and knowledge factors are included in Appendix H.

Determination of Principal Axis Factors For Job Titles

A factor analysis with varimax rotation technique was performed using the IBM 7040 Computer, to cluster the 126 different agriculturally-oriented job titles (306 job positions) based upon the workers' responses concerning activities and knowledges used in their jobs. A representative profile of the degree of competency needed in each worker activity or area of knowledge was first made for each of the 126 agricultural jobs by calculating the mean to the nearest whole number and tenth value. When the varimax rotation technique was performed, ten "factors" emerged as groupings of job titles with high "factor loadings". The variance accounted for was 64.05 per cent using the rotation technique. The ten factors were:

#1 Management and Supervision

General director of rural grocery and variety store.
General director and distributer for wholesale and retail dairy products, meat, and grocery company.
General director of small farm building, farm equipment, and lumber company.
Agent for insurance company.
General director of hardware store and feed mill.
General director of motor company.
General director of hardware, electrical and building supply, paint, and wallpaper company.
General director of garage and service station.
General director of farm machinery and equipment sales and service company, including auto and truck sales and service.
General director of pest control company.
General director and district distributer in petroleum bulk plant.
General director for heating and plumbing company.
General director of feed mill, farm supply store, and farm machinery sales and service.

#1. Management and Supervision-continued

Bookkeeper in livestock sales company.
Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.
General director of show and riding academy, horse farm and hospital.
General director of ice cream and dairy products company.
General director of fuel distribution and service company.
General director and manager of tobacco warehouse company.
General director of retail florist shop.
General director for egg buying, grading and wholesale-retail company.
General director of large farm building construction, farm equipment sales, and lumber company.
General director of grocery store.
Sales manager for insurance company.
General director of vegetable producing company.
Director of general farm supply and service company.
General manager of public utilities and fuel distribution company.
General director of landscaping, florist, and greenhouse business.
Naturalist in State Park.
General director of grain elevator and farm supply store.
General director of restaurant and liquors store.
Director of retail meat and grocery store.
General director for feed and coal distribution company.
General manager of real estate company.
General director for insurance company.
Office manager for farm machinery sales and service company.
Director of aluminum siding company.
General director of wholesale vegetable produce and sales company.
Product salesman and office manager for stone company.
Service supervisor for farm machinery company.
General director of livestock auction company.
Shop foreman for farm building construction, farm equipment, lumber, and coal company.
General director of ready mix concrete and concrete block company.
General director of slaughter and meat processing company.
General director of feed and livestock supply company.
Salesman in pest control company.
General director for livestock marketing cooperative.
Service director of pest control company.
General director of state police district station.
Office director of livestock marketing cooperative.
Life insurance agent.
Sales manager for hardware, electrical, plumbing, and building-supply store.
General director and mill operator for feed and farm supply store.
Clerk for grocery and variety store.
General director of service station, tractor and truck repair shop.
Truck driver for dairy products, meat, and grocery company.

#2. Service and Mechanical

Mechanic for automobile, tractor, and power unit repair company.
Serviceman for furnance company.
Mechanic for feed mill and farm and dairy supply company.
Mechanic for farm machinery, farm equipment, automobile, and truck company.
Head mechanic and salesman for farm machinery and equipment company.
Plumber for plumbing company.
General director for nursing home.
Service station attendant and automobile mechanic.
Weighman and general worker in tobacco warehouse company.
Maintenance man for feed mill and grain elevator.
Shop foreman for farm machinery sales and service company.
Truck driver and yard worker for small farm building, farm equipment, lumber, and coal company.
Bottling machine operator for dairy products company.
Clerk in feed mill.
Route serviceman for pest control company.
Freezer inspection man for dairy products company.
Electrician for plumbing company.
Claims adjuster for insurance company.
Weighman in livestock sales company.
Plant foreman for stone and concrete block company.
General director of florist and greenhouse business.
Salesman in feed and farm supply store.

#3. Sales and Processing

Conservation instructor in 4-H camp.
Grader for livestock cooperative.
Yardman for stockyard and feeder cattle business.
Butcher for frozen food locker and meat processing company, including sausage making and boning.
Millman for feed mill.
Warehouse man for feed mill, farm supply, fertilzer, and lumber company.
Meat cutter for supermarket.
Salesman for feed mill and farm supply store.
Seed cleaning and inspection foreman for seed company.

#4. Service - Animal Science Oriented

Exercise boy and groom boy for horse rehabilitation farm and horse hospital.
Foreman for horse rehabilitation farm and horse hospital.
Contact man for livestock auction company.
Produce man in supermarket grocery store.
Field service worker for health department.
Director, farm management company.
General worker in farm supply and service company.
Hatchery operator and breed selection man for poultry company.

#5. Grower-Processor - Plant Science Oriented

Worker for vegetable producing company.
Worker in wholesale vegetable produce company.
Custodian for public school system, state park, church, hotel, nursing home, and department store.
Deliveryman for retail florist shop.
Truck driver for livestock marketing and auction company.
Cook for camp, school, restaurant or nursing home.
Plant process man for poultry processing company.
General director and mill operator for feed and farm supply store.
Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.
Route salesman for wholesale and retail dairy products, meat, and grocery company.
Sales clerk and bookkeeper in retail meat store and meat processing company.

#6. Sales - Mechanics Oriented

Salesman for farm machinery, automobile and truck equipment sales and service, and feed company.

#7. Sales - Tobacco and Poultry Oriented

Office worker in tobacco warehouse company.
Salesman for egg, poultry, and poultry processing company.
Truck driver and pick-up man for wholesale-retail egg company.

#8. Service-Processor - Plant Science Oriented

Worker for landscaping and greenhouse business.
Clerk in feed mill and farm supply store.
Outside foreman for grain elevator, feed mill, farm supply, and farm machinery sales company.
General director for fertilizer and limestone company.
Produce and meats manager in grocery-supermarket.
Produce man in supermarket-grocery store.

#9. Horticulture Oriented

Caretaker in show and riding academy, including horse trainer on horse farm.
Maintenance man in State Park.

#10. Building and Construction Oriented

Shipping manager for hardware, building, plumbing, and electricial supply company.
Sales manager for hardware, electrical, plumbing, and building-supply store.
Carpenter for lumber and farm building construction company.

The job title clusters seemed to be identifiable based on general job function. There were many jobs that, based on inspection of the title, did not appear to belong in a particular cluster. However, it is likely that many workers held multi-functional job responsibilities, particularly in the smaller businesses.

The data for each of the ten job-title factors are included as Appendix I.

Determination of Principal Axis Factors for Activities and Knowledges Within Job Title Factors

Following the factor analysis using the varimax rotation technique to cluster the 126 different agriculturally-oriented job titles, the IBM cards containing the knowledge and activity data were sorted into each of the ten identified job cluster groups. A separate factor analysis procedure was then performed using the IBM 7040 Computer, to cluster the 92 knowledge and activity variables for the observations within a job-title cluster. From 3 to 15 activity and knowledge factors or "clusters" were identified for each job-title cluster. The factors or "clusters" which emerged, were groupings of competencies with high "factor loadings", and can be translated into specific content areas.

Fifteen activity and knowledge factors were identified for job title cluster 1:

#1. Management and Supervision - 56 titles

Factor 1

Maintaining
Adjusting
Repairing
Operating
Mixing
Installing
Calibrating
Selecting
Inspecting, testing, trouble shooting

Factor 2

Feeds
Livestock
Animal nutrition
Dairy
Poultry
Animal diseases

Factor 3

Business principles
Office procedures
Taxes
Insurance
Credit
Accounting
Salesmanship

Factor 4

Sound and light
Electronics
Metallurgy
Mechanics
Designing
Remodeling
Sketching and drawing
Hydraulics
Heat

Factor 5

Supervising others
Handling men(boss)
Appraising work of others
Training others
Inducting new personnel
Advising, consulting, and diagnosing
Inspecting

Factor 6

Architecture
Carpentry
Farm buildings
Sketching and drawing

#1. Management and Supervision - 56 titles, continued

Factor 7

Writing articles, copy, etc.
Making speeches
Developing techniques

Factor 8

Policy-making
Planning
Decision-making
Handling money
Promoting
Buying
Planning production or service

Factor 9

Research procedures
Conducting research
Food processing

Factor 10

Salesmanship
Meeting non-farm people
Meeting farm people
Estimating costs
Selling

Factor 11

Advanced mathematics
Physics

Factor 12

Insect and pest control
Plant diseases
Agricultural chemicals
Soils
Crops
Floriculture
Soil and water management
Horticulture

Factor 13

Constructing equipment, tools(hand or power) supplies and instruments
Designing
Making and building
Assembling
Floriculture

Factor 14

Shop work
Farm mechanization
Farm conveniences
Tractors and other power units
Testing
Agricultural economics
Electricity

Factor 15

Filing
Inventorying
Rural recreation
Planning production or service
Keeping records and accounts

Fifteen activity and knowledge factors were identified for job title cluster 2:

#2. Service and Mechanical - 22 titles

Factor 1

Agricultural chemicals
Business principles
Credit
Salesmanship
Promoting
Handling money
Insect and pest control
Meeting non-farm people
General agriculture and rural life knowledge
Keeping records and accounts

Factor 2

Farm conveniences
Testing
Tractors and other power units
Shop work
Installing
Electricity
Farm mechanization
Assembling
Agricultural economics

#2. Service and Mechanical - 22 titles, continued

Factor 3

Making speeches
Making technical reports
Constructing equipment, tools(hand or power) supplies and instruments
Designing
Making and building
Sketching and drawing
Selecting
Plant diseases

Factor 4

Supervising others
Appraising work of others
Handling men(boss)
Training others
Buying

Factor 5

Feeds
Animal nutrition
Poultry
Crops
Soil and water management
Livestock
Animal diseases
Dairy
Horticulture

Factor 6

Taxes
Accounting
Filing
Policy-making
Floriculture
Plant diseases
Buying
Horticulture
Inventorying
Insurance

Factor 7

Electronics
Metallurgy
Mixing
Hydraulics
Mechanics

Factor 8

Calibrating
Calculating costs
Remodeling
Heat
Assembling
Inspecting, testing, trouble shooting
Mechanics
Adjusting

Factor 9

Reading technical reports
Hydraulics

Factor 10

Operating
Maintaining
Repairing
Adjusting

Factor 11

Carpentry

Factor 12

Food processing
Dairy

Factor 13

Estimating costs
Decision-making

Factor 14

Inspecting

Factor 15

Meeting farm people

Fifteen activity and knowledge factors were identified for job title cluster 3:

#3. Sales and Processing - 9 titles

Factor 1

Agricultural economics
Agricultural chemicals
Farm conveniences
Accounting
Insect and pest control
Credit
Farm mechanization
Rural recreation
Office procedures
Planning
Plant diseases
Promoting
Salesmanship
Accounting
Selling

#3. Sales and Processing - 9 titles, continued

Factor 2

- Training others
- Appraising work of others
- Inducting new personnel
- Handling men(boss)
- Supervising others
- Carpentry
- Shop work
- Inventorying
- Electricity

Factor 3

- Designing
- Food processing
- Developing techniques
- Calculating costs
- Assembling

Factor 4

- Making technical reports
- Reading technical reports
- Writing articles, copy, etc.
- Farm buildings
- Animal diseases
- Planning

Factor 5

- Taxes
- Insurance
- Accounting

Factor 6

- Handling money
- Floriculture
- Horticulture
- Salesmanship
- Selling
- Filing

Factor 7

- Remodeling
- Heat
- Installing
- Assembling
- Repairing

Factor 8

- Livestock
- Testing
- Advising, consulting, and diagnosing

Factor 9

- Selecting
- Tractors and other power units
- Crops
- Shop work

Factor 10

- Planning production or service
- Keeping records and accounts
- Dairy
- Poultry
- Using technical and service manuals, parts lists
- General agriculture and rural life knowledge

Factor 11

- Buying
- Estimating costs
- Decision-making

Factor 12

- Making and building
- Calibrating

Factor 13

- Forestry
- Soil and water management
- Soils

Factor 14

- Selecting

Factor 15

- Filing

Ten activity and knowledge factors were identified for job title cluster 4:

#4. Service - Animal Science Oriented - 8 titles

Factor 1

Credit
Insurance
Taxes
Soil and water management
Soils
Carpentry
Forestry
Inventorying
Selling
Testing
Plant diseases
Agricultural chemicals
Business principles
Dairy
Agricultural economics
Chemistry
Writing articles,copy,etc.
Salesmanship
Planning
Filing
Insect and pest control
Poultry
Accounting
Tractors and other power units
Making technical reports
Reading technical reports
Farm conveniences
Farm buildings

Factor 2

Conducting research
Developing techniques
Electricity
Research procedures
Selecting
Training others
Appraising work of others
Supervising others
Handling men(boss)
Inspecting, testing, trouble shooting
Insect and pest control
Poultry
Making technical reports
Reading technical reports
Planning production or service
Animal nutrition
Buying
Animal diseases
Promoting

Factor 3

Repairing
Assembling
Calibrating
Adjusting
Maintaining
Installing
Shop work
Tractors and other power units
Handling men(boss)
Inspecting, testing, trouble shooting
Training others
Selecting
Appraising work of others
Supervising others

Factor 4

Rural recreation
Office procedures
Operating
Keeping records and accounts

Factor 5

Making speeches
Estimating costs
Farm mechanization
Advising, consulting, and diagnosing

Factor 6

Decision-making
Crops
Horticulture

Factor 7

Farm buildings
Farm conveniences

Factor 8

Meeting non-farm people
Meeting farm people

Factor 9

Mixing
Inspecting
Using technical and service manuals, parts lists

Factor 10

Planning production or service
Accounting

Fifteen activity and knowledge factors were identified for job title cluster 5:

#5. Grower-Processor - Plant Science Oriented - 11 titles

Factor 1

- Hydraulics
- Rural recreation
- Mechanics
- Farm conveniences
- Assembling
- Farm mechanization
- Shop work
- Carpentry
- Farm buildings
- Testing
- Electronics
- Installing
- Inspecting
- Plant diseases

Factor 2

- Handling money
- Selling
- Office procedures
- Business principles
- Salesmanship
- Meeting non-farm people
- Promoting
- Inventorying
- Meeting farm people

Factor 3

- Handling men(boss)
- Inducting new personnel
- Appraising work of others
- Supervising others
- Training others

Factor 4

- Agricultural chemicals
- Insect and pest control
- Accounting
- Filing
- Calibrating
- Mixing

Factor 5

- Adjusting
- Repairing
- Operating
- Tractors and other power units
- Calibrating
- Maintaining

Factor 6

- Calculating costs
- Agricultural economics
- Using technical and service manuals, parts lists
- Selecting
- Farm buildings
- General agriculture and rural life knowledge

Factor 7

- Policy-making
- Buying
- Taxes
- Estimating costs
- Insurance
- Selecting
- Mixing

Factor 8

- Soils
- Crops
- Using technical and service manuals, parts lists
- Horticulture
- Feeds
- Credit
- Soil and water management
- Livestock
- Plant diseases
- Decision-making

Factor 9

- Animal diseases
- Animal nutrition

Factor 10

- Writing articles, copy, etc.
- Farm mechanization
- Keeping records and accounts
- Farm conveniences

#5. Grower-Processor - Plant Science Oriented - 11 titles, continued

Factor 11

Electricity
Food processing
Poultry

Factor 12

Installing
Inspecting, testing, trouble shooting
Shop work
Carpentry

Factor 13

Advising, consulting, and diagnosing
Assembling

Factor 14

Making and building

Factor 15

Architecture
Heat
Research procedures
Sound and light
Metallurgy
Foreign language
Advanced mathematics
Physics
Chemistry
Forestry

Three activity and knowledge factors were identified for job title cluster 6:

#6. Sales - Mechanics Oriented - 1 title

Factor 1

Calculating costs
Using technical and service manuals, parts lists
Developing techniques
Inspecting, testing, trouble shooting
Handling money
Making technical reports
Crops

Factor 2

Making speeches
Selling
Buying
Meeting farm people

Factor 3

Meeting non-farm people
Advising, consulting, and diagnosing
Estimating costs
Keeping records and accounts
Reading technical reports
Decision-making

Four activity and knowledge factors were identified for job title cluster 7:

#7. Sales - Tobacco and Poultry Oriented - 3 titles

Factor 1

Filing
Inventorying
Selling
Feeds
Salesmanship
Adjusting
Handling men(boss)
Calculating costs
Making technical reports
Crops
Using technical and service manuals, parts lists
Repairing
Promoting
Animal nutrition
Animal diseases
Poultry
Taxes
Insurance
Food processing
Maintaining
Operating
Handling money
Meeting non-farm people
Keeping records and accounts

#7. Sales - Tobacco and Poultry Oriented - 3 titles, continued

Factor 2

- Testing
- Assembling
- Tractor and other power units
- Farm mechanization
- Shop work
- Carpentry
- Farm conveniences
- General agriculture and rural life knowledge
- Mechanics
- Office procedures
- Business principles
- Meeting farm people
- Credit
- Accounting

Factor 3

- Heat
- Hydraulics
- Architecture
- Metallurgy
- Electronics
- Sound and light
- Research procedures
- Foreign language
- Physics
- Advanced mathematics
- Chemistry

Factor 4

- Buying
- Advising, consulting, and diagnosing
- Estimating costs
- Inducting new personnel
- Training others
- Appraising work of others
- Supervising others
- Making and building
- Designing
- Sketching and drawing
- Mixing

Thirteen activity and knowledge factors were identifed for job title cluster 8:

#8. Service-Processor - Plant Science Oriented - 6 titles

Factor 1

- Agricultural economics
- Carpentry
- Electricity
- Farm conveniences
- Farm buildings
- Tractors and other power units
- Shop work
- Business principles
- Insurance
- Office procedures
- Taxes
- General agriculture and rural life knowledge
- Farm mechanization
- Credit
- Salesmanship

Factor 2

- Handling men(boss)
- Appraising work of others
- Supervising others
- Inspecting
- Operating
- Mixing
- Training others
- Adjusting
- Decision-making
- Planning production or service
- Testing
- Food processing
- Maintaining
- Making technical reports
- Inspecting, testing, trouble shooting
- Promoting
- Calibrating

Factor 3

- Insect and pest control
- Soil and water management
- Soils
- Horticulture
- Floriculture
- Calculating costs
- Agricultural chemicals
- Plant diseases
- Crops
- Buying
- Planning
- Developing techniques
- Food processing

Factor 4

- Remodeling
- Selecting
- Calibrating
- Policy-making
- Shop work
- Inventorying

Factor 5

- Meeting non-farm people
- Meeting farm people
- Filing
- Promoting
- Selling
- Developing techniques
- Reading technical reports

Factor 6

- Designing
- Making speeches
- Repairing
- Policy-making
- Assembling
- Inspecting, testing, trouble shooting

#8. Service-Processor - Plant Science Oriented - 6 titles, continued

Factor 7

Conducting research
Making and building
Assembling
Training others

Factor 8

Advanced mathematics
Estimating costs
Accounting
Planning
Taxes

Factor 9

Advising, consulting,
 and diagnosing
Inducting new personnel
Mechanics
Chemistry
Planning production
 or service
Inspecting, testing,
 trouble shooting
Selecting
Farm mechanization

Factor 10

Poultry
Feeds
Livestock
Animal nutrition
Dairy
Handling money
Animal diseases

Factor 11

Forestry

Factor 13

Plant diseases

Factor 12

Installing
Maintaining

Four activity and knowledge factors were identified for job title cluster 9:

#9. Horticulture Oriented - 2 titles

Factor 1

Carpentry
Meeting non-farm people
Estimating costs
Making and building
Sketching and drawing
Assembling
Testing
Using technical and
 service manuals,
 parts lists
Developing techniques
Repairing
Operating
Keeping records and
 accounts
Making technical reports
Reading technical reports
Soils
Soil and water management
Livestock
Feeds
Animal nutrition
Animal diseases
Tractors and other
 power units
Electricity
Farm mechanization
Shop work
Meeting farm people
Farm buildings
Farm conveniences
General agriculture and
 rural life knowledge
Insect and pest control

Factor 2

Supervising others
Designing
Buying
Appraising work of others
Advising, consulting,
 and diagnosing
Selecting
Mixing
Inspecting, testing,
 trouble shooting
Installing

Factor 3

Metallurgy
Architecture
Hydraulics
Mechanics
Sound and light
Heat
Electronics
Foreign language
Research procedures
Advanced mathematics
Physics
Chemistry

Factor 4

Assembling
Constructing equipment,
 tools(hand or power)
 supplies and instruments
Crops
Planning production
 or service
Conducting research
Filing
Forestry

Three activity and knowledge factors were identifed for job title cluster 10:

#10. Building and Construction Oriented - 3 titles

Factor 1

Advising, consulting, and diagnosing
Estimating costs
Sketching and drawing
Inspecting
Using technical and service manuals, parts lists
Planning production or service
Operating
Inspecting, testing, trouble shooting
Selecting
Keeping records and accounts
Soils
Salesmanship
Architecture
Calculating costs

Factor 2

Supervising others
Making and building
Operating
Credit
Business principles
Mechanics
Carpentry
Policy-making
Office procedures
Assembling
Handling men(boss)
Training others
Appraising work of others
General agriculture and rural life knowledge
Farm buildings
Agricultural economics
Farm mechanization
Rural recreation

Factor 3

Designing
Testing
Calibrating
Remodeling
Adjusting
Installing
Meeting non-farm people
Meeting farm people

The data for each of the activity and knowledge factors within each job title cluster are included in Appendix J.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Restatement of the Problem

The purpose of the study was to determine the employment opportunities and agricultural competencies needed by workers in present and emerging non-farm agricultural occupations in a thirty-eight county area in Appalachia. Special emphasis was placed on determining the post-high school educational curriculums needed to prepare workers to enter or progress in agricultural technician level occupations.

The study involved six major tasks:

1. The development of a questionnaire in order to obtain information about: (1) the functions of each firm, the kinds and numbers of workers in present and anticipated job titles in the firm, (2) the specific activities in which workers engage, and (3) the knowledges workers use in their jobs.

2. The training of an interview team, and the interviewing of a selected sample of 284 business firms in the thirty-eight county region of study.

3. The mathematical projections of the data to determine:

    a) the total number of workers currently employed in the types of businesses defined.

    b) the total number of workers currently employed in agriculturally oriented jobs.

    c) the total number of agricultural technicians currently employed.

    d) the functions of businesses studied.

    e) the additional number of agricultural technicians needed in the next 3 and 5 year period.

    f) the educational requirements, work experience requirements, and age limitations for agricultural technician jobs on which data were gathered.

4. The determination of principal-axis factors for 92 activity and knowledge variables, using the data for 306 identified agriculturally oriented job positions.

5. The determination of principal-axis factors for 126 different agriculturally oriented job titles, based upon the worker's responses concerning activities and knowledges used in their jobs.

6. The determination of principal-axis factors for 92 activity and knowledge variables within each of ten identified job-title clusters, based upon the workers' responses concerning activities and knowledges used in their jobs.

The Conclusions

A. Estimates derived from the sample data obtained in Type 1 and Type 2 business firms in the 38 county region of study indicated that:

1. Forty per cent of all workers employed in non-farm agricultural businesses (Type 1) need some knowledge and skills in agriculture.

2. Sixteen per cent of all workers employed in non-agricultural businesses that may employ agricultural workers (Type 2) need some knowledges and skills in agriculture.

3. It was possible to project the numbers of employment opportunities for the identified agricultural technical and agricultural vocational job titles. The job-titles were subdivided by level; i.e., technical job or vocational job within each job title cluster. The projections for job-title cluster 1 are shown in Table 20. The projections for job-title cluster 2 through 10 are shown in Tables 21 through 29 respectively.

4. Of every 10 potential job opportunities for workers needing agricultural knowledge and skills, 6 were in the twenty-eight county Kentucky region studied and 4 were in the ten-county Ohio area studied.

    a) Of every 10 potential job openings in Kentucky, 5 were in telephone exchange areas where the largest town had a population of 5,000 or more, 3 were in telephone exchange areas where the largest town had a population of 1,000-5,000, and 2 were in telephone exchange areas where the largest town had a population of less than 1,000.

    b) Of every 10 potential job openings in Ohio, 6 were in telephone exchange areas where the largest town had a population of 5,000 or more, 2 were in telephone exchange areas where the largest town had a population of 1,000-5,000, and 2 were in telephone exchange areas where the largest town had a population less than 1,000.

5. Two and one-half times more agricultural vocational workers than agricultural technicians will be needed to take entry-level positions in the next five years.

6. Most of the business firms interviewed were multi-functional, and workers in job titles in the smaller firms tended to hold jobs that were multi-functional in nature. Purchasing, service, and retailing were the predominant functions among the businesses studied.

7. The rate of employee turnover was largest in businesses having the most part-time workers.

8. There appeared to be a high potential for job openings for agricultural-technical workers.

   a) 3359 agricultural-technicians were currently employed.

   b) 8 of every 10 businesses in the universe which employ workers needing agricultural knowledge and skills were businesses which appear non-agricultural (Type 2). See Appendix B4-B11 for a list of these business titles.

   c) 3 of every 10 workers employed in agriculturally oriented jobs studied were performing jobs which required technical level proficiency, while 7 of every 10 workers employed in agriculturally oriented jobs studied were performing jobs requiring vocational level proficiency.

   d) 9 of every 10 agricultural-technical position openings anticipated in the next five years will be full-time jobs.

   e) At least 500 but not more than 2400 new agricultural technicians will be needed annually in the region of study. This range is evident when we note that 12,017 agricultural technicians were employed in the last five years in the region of study. This was approximately three times the number of new agricultural technicians anticipated in the next five years. It can be concluded there has been a high degree of turnover of agricultural-technical workers, probably due to the trend for these workers to move out of the area to better paying jobs. There was a higher degree of employee turnover in agricultural-technical jobs in the Kentucky counties studied than in the Ohio counties. More specifically, there was a higher degree of employee turnover in agricultural-technical jobs in the telephone exchanges in Kentucky where the population of the largest town was under 1,000 than for the same geographical areas studied in Ohio.

   f) Employers expect a 40 per cent increase in the number of employees needing technical competencies in agriculture in the next five years. This is higher than the anticipated expansion of the total labor force.

   g) Employers have been willing to hire untrained persons under 20 years of age and train these people in technical skills on-the-job because the employer had been uable to find trained people. Employers indicate they would rather hire and pay a higher wage to trained-technical workers rather than train a worker on-the-job if trained technical workers are available.

B. It was possible to determine the general competency areas needed for entry and advancement by workers in jobs needing agricultural knowledges and skills, and to group these worker activities and knowledges into clusters so that general competency areas could be identified. See Appendix H.

C. It was possible to determine "clusters" or "families" of agricultural-technical and agricultural-vocational job-titles based upon the workers' responses concerning activities and knowledges used in their jobs. See Appendix I.

D. It was possible to determine more specific competency needs of workers in agricultural technical and vocational job titles identified. This reinforcing technique was designed to enable the investigators to better determine the level of competency needed by workers in job titles identified. See Appendix J.

E. The job-titles within each job-title cluster could be defined as technical or vocational level jobs, as shown in Tables 20 through 29. Workers with vocational job titles probably perform the activities and use the knowledges identified at the vocational level, while those workers with technical job titles probably perform activities and use the knowledges identified at the technician level.

Limitations

The study did not include businesses defined as non-agricultural with no apparent possibilities for agricultural workers. (Type 3 businesses). However, other state studies have shown that employment opportunities do exist in these kinds of firms for persons who need training in plant and animal science, and agricultural mechanics. Therefore, there probably have been left out some of the agricultural job opportunities.

TABLE 20

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 1 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director of small farm building, farm equipment, and lumber company.	0	6	0	6	0	6
General director of garage and service station.	0	6	0	6	0	6
General director for heating and plumbing company.	0	1	0	0	40	0
General director of show and riding academy, horse farm and hospital.	1	1	0	5	0	5
General director of retail florist shop.	0	11	0	8	0	8
General director for egg buying, grading and wholesale-retail company.	0	5	0	0	0	0
General director of large farm building construction, farm equipment sales, and lumber company.	0	10	0	0	0	0
Sales manager for insurance company.	0	3	0	0	0	0
General manager of public utilities and fuel distribution company.	0	1	0	80	0	80
General director of landscaping, florist, and greenhouse business.	1	14	0	0	0	0
Naturalist in a State Park.	1	0	66	0	66	0
Director of retail meat and grocery store.	0	2	0	0	0	0
General director for insurance company.	0	12	0	160	0	160

TABLE 20-continued

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities 3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Office manager for farm machinery sales and service company.	0	1	0	0	0	0
Products salesman and office manager for stone company.	0	2	0	0	0	0
Service supervisor for farm machinery company.	0	1	0	0	0	0
General director of slaughter and meat processing company.	1	3	0	0	0	0
Service director of pest control company.	2	5	0	6	0	6
General director of state police district station.	0	2	0	0	0	66
Sales manager for hardware, electrical, plumbing, and building-supply store.	2	11	0	0	0	0
Truck driver for dairy products, meat and grocery company.	0	4	0	10	0	10
Totals for Agricultural Technical Job Titles	8	101	66	281	106	347

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities 3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director of rural grocery and variety store.	0	32	0	0	0	0
General director and distributor for wholesale and retail dairy products, meats and grocery company.	0	8	0	0	0	6

TABLE 20-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Agent for insurance company.	0	3	0	40	0	40
General director of hardware store and feed mill.	1	1	0	0	0	0
General director of motor company.	0	6	0	0	0	0
General director of hardware, electrical and building supply, paint, and wallpaper company.	0	8	0	0	0	0
General director of farm machinery and equipment sales and service company, including auto and truck sales and service.	1	14	0	6	0	6
General director of pest control company.	0	6	0	0	0	0
General director and district distributor in petroleum bulk plant.	0	5	0	0	0	0
General director of feed mill, farm supply store, and farm machinery sales and service.	1	26	0	11	0	11
Bookkeeper in livestock sales company.	0	1	0	0	0	0
Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.	0	1	0	0	0	0
General director of ice cream and dairy products company.	0	3	0	0	0	0
General director and manager of tobacco warehouse company.	0	14	0	47	0	77
General director of grocery store.	0	13	0	0	0	0

TABLE 20-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director of vegetable producing company.	0	4	0	0	0	0
Director of general farm supply and service company.	0	4	0	0	0	0
General director of grain elevator and farm supply store.	0	1	0	0	0	0
General director of restaurant and liquors store.	0	13	0	0	0	0
General manager of real estate company.	0	2	0	0	0	0
Director of aluminum siding company.	0	1	0	0	0	0
General director of wholesale vegetable produce and sales company.	1	4	0	0	0	0
General director of livestock auction company.	0	2	0	0	0	0
Shop foreman for farm building construction, farm equipment, lumber, and coal company.	0	2	0	0	0	0
General director of ready mix concrete and concrete block company.	0	3	0	0	0	0
Salesman in pest control company.	0	14	0	6	0	6
General director for livestock marketing cooperative.	0	1	0	0	0	0
Office director of livestock marketing cooperative.	0	1	0	0	0	0
Life insurance agent.	0	23	0	132	0	66

TABLE 20-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director and mill operator for feed and farm supply store.	0	3	0	0	0	0
Clerk for grocery and variety store.	21	15	0	1120	0	1920
General director of service station, tractor and truck repair shop.	0	5	0	0	0	0
Totals for Agricultural Vocational Job Titles	25	239	0	1362	0	2132
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	33	366	66	1643	106	2479

TABLE 21

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 2 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Mechanic for automobile, tractor, and power unit repair company.	0	2	0	0	0	0
Serviceman for furnace company.	0	2	0	0	0	0
Mechanic for feed mill and farm and dairy supply store.	0	5	0	5	0	5
Mechanic for farm machinery, farm equipment, automobile, and truck company.	1	17	0	43	0	80
Head mechanic and salesman for farm machinery and equipment company.	2	4	0	0	0	0
Plumber for plumbing company.	0	1	0	80	0	80
Service station attendant and automobile mechanic.	1	16	0	20	0	73
Weighman and general worker in tobacco warehouse company.	8	11	21	82	21	123
Maintenance man for feed mill and grain elevator.	0	1	0	0	0	0
Shop foreman for farm machinery sales and service company.	0	1	0	0	0	0
Clerk in feed mill.	0	1	0	0	0	0
Route serviceman for pest control company.	2	25	0	26	0	26
Freezer inspection man for dairy products company.	0	2	0	0	0	0

TABLE 21-continued

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Electrician for plumbing company.	0	1	0	80	0	80
Claims adjuster for insurance company.	0	11	0	132	0	66
Plant foreman for stone and concrete block company.	0	14	0	0	0	7
General director of florist and greenhouse business.	1	1	0	0	0	0
Totals for Agricultural Technical Job Titles	15	115	21	468	21	540

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director for nursing home.	0	3	0	0	0	0
Truck driver and yard worker for small farm building, farm equipment, lumber and coal company.	0	25	0	800	0	1056
Bottling machine operator for dairy products company.	0	1	0	0	0	0
Weighman in livestock sales company.	4	0	43	0	74	0
Salesman in feed and farm supply store.	2	7	0	12	0	12
Totals for Agricultural Vocational Job Titles	6	36	43	812	74	1068
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	21	161	64	1280	95	1608

TABLE 22

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 3 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Grader for a livestock cooperative.	2	2	0	0	0	0
Yardman for stockyard and feeder cattle business.	0	1	0	24	0	54
Millman for feed mill.	0	11	0	21	0	27
Meat cutter for supermarket.	0	5	0	60	0	120
Seed cleaning and inspection foreman for seed company.	0	1	0	0	0	0
Totals for Agricultural Technical Job Titles	2	20	0	105	0	201

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Conservation instructor in 4-H camp.	3	0	8	0	16	0
Butcher for frozen food locker and meat processing company, including sausage making and boning.	0	14	0	160	0	160
Warehouse man for feed mill, farm supply fertilizer, and lumber company.	0	2	0	14	0	14
Salesman for feed mill and farm supply store.	2	7	0	12	0	12
Totals for Agricultural Vocational Job Titles	5	23	8	186	16	186
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	7	43	8	291	16	387

TABLE 23

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 4 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Director of farm management company.	0	1	0	7	0	7
Hatchery operator and breed selection man for poultry company.	0	1	0	0	0	0
Totals for Agricultural Technical Job Titles	0	2	0	7	0	7

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Exercise boy and groom boy for horse rehabilitation farm and horse hospital.	0	12	0	2800	0	4000
Foreman for horse rehabilitation farm and horse hospital.	0	1	0	0	0	0
Contact man for livestock auction company.	0	2	0	0	0	0
Produce man in supermarket-grocery store.	0	4	0	160	0	320
Field service worker for health department.	0	8	0	0	0	0
General worker in farm supply and service company.	3	0	56	0	93	0
Totals for Agricultural Vocational Job Titles	3	27	56	2960	93	4320
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	3	29	56	2967	93	4327

TABLE 24

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 5 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Custodian for public school system, state park, church, hotel, nursing home, and department store.	8	26	0	198	0	0
Totals for Agricultural Technical Job Title	8	26	0	198	0	0

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Worker for vegetable producing company.	23	0	50	0	75	0
Worker in wholesale vegetable producing company.	5	0	12	0	24	0
Deliveryman for retail florist shop.	0	1	0	0	0	0
Truck driver for livestock marketing and auction company.	2	0	0	0	0	0
Cook for camp,school,restaurant or nursing home.	6	35	60	66	132	0
Plant process man for poultry processing company.	0	25	0	149	0	198
General director and mill operator for feed and farm supply store.	0	3	0	0	0	0

TABLE 24-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.	2	10	10	26	15	30
Route salesman for wholesale and retail dairy products, meat, and grocery store.	0	15	0	20	0	25
Sales clerk and bookkeeper in retail meat store and meat processing company.	4	22	0	10	0	10
Totals for Agricultural Vocational Job Titles	42	111	132	271	246	263
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	50	137	132	469	246	263

TABLE 25

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 6 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Salesman for farm machinery, automobile and truck equipment sales and service, and feed company.	1	15	0	20	0	25
Total for Agricultural Technical Job Title	1	15	0	20	0	25
Total for Agricultural Vocational Job Title	0	0	0	0	0	0
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	15	0	20	0	25

TABLE 26

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 7 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Salesman for egg, poultry, and poultry processing company.	0	1	0	15	0	25
Total for Agricultural Technical Job Title	0	1	0	15	0	25

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Office worker in tobacco warehouse company.	0	7	0	0	0	0
Truck driver, pick-up man for wholesale-retail egg company.	1	2	16	0	16	0
Totals for Agricultural Vocational Job Titles	1	9	16	0	16	0
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	10	16	15	16	25

TABLE 27

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 8 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Worker for landscaping and greenhouse business.	1	7	0	24	0	40
Outside foreman for grain elevator, feed mill, farm supply, and farm machinery sales company.	0	2	0	0	0	0
Totals for Agricultural Technical Job Titles	1	9	0	24	0	40
Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Clerk in feed mill and farm supply store.	0	4	0	8	0	8
General director for fertilizer and limestone company.	0	1	0	0	0	0
Totals for Agricultural Vocational Job Titles	0	5	0	8	0	8
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	14	0	32	0	48

TABLE 28

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 9 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities 3 Years		Projected Job Opportunities 5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Caretaker in show and riding academy, including horse trainer on horse farm.	0	1	0	5	0	5
Totals for Agricultural Technical Job Title	0	1	0	5	0	5

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities 3 Years		Projected Job Opportunities 5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Maintenance man in state park.	0	2	0	0	0	0
Totals for Agricultural Vocational Job Title	0	2	0	0	0	0
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	0	3	0	5	0	5

TABLE 29

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 10 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Sales manager for hardware, electrical, plumbing, and building supply store.	0	4	0	0	0	0
Carpenter for lumber and farm building construction company.	1	32	15	99	15	191
Totals for Agricultural Technical Job Titles	1	36	15	99	15	191
Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Shipping manager for hardware, building, plumbing, and electrical supply company.	0	1	0	0	0	0
Totals for Agricultural Vocational Job Titles	0	1	0	0	0	0
TOTAL AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	37	15	99	15	191

The Recommendations

Information has been presented concerning:

1. Identification of agriculturally-oriented jobs.
2. Employment opportunities in the jobs identified.
3. How the activities used and knowledges needed by workers cluster together in general courses which may be offered.
4. How the identified job titles cluster together for training.

Who May Use the Results

The information presented in this report should be of interest to employment service counselors, personnel directors, employee counselors, school counselors, vocational and technical teachers, educational leaders, and laymen who are involved in the research, planning, and carrying-out of training programs at all experience and educational levels.

In a special effort to make the results more meaningful to user groups, the research staff carefully compared each of the agriculturally-oriented job titles identified with job descriptions in the Dictionary of Occupational Titles, Third Edition, 1965. The names and D.O.T. numbers are presented in Appendix K and L for the Dictionary of Occupational Title (s) most nearly corresponding to the job description as obtained by the interviewers. The reader may notice that many of the D.O.T. job-titles fall in the plant and animal science, or mechanics areas, and tend to be based upon worker functions.

How the Results May be Used

1. The investigators believe the data have been scientifically obtained and systematically analyzed to this stage of curriculum development. The activity and knowledge factors identified tell the investigators what general areas of knowledge the workers need as they perform identified job activities. The identified job-title clusters tell the investigators what kinds of people can be trained together, based upon their responses on the activities and knowledges.

2. It is not practical to have a different curriculum for each different job title identified for which workers should be trained. For example, there are 56 job titles in job-title Cluster 1, listed on pages 3-15 and 3-16. According to the data in Table 20, these 56 job titles represent 2479 full-time job opportunities in the next five years; 347 jobs at the technical level and 2132 jobs at the vocational level. Persons with these job titles may be pursuing varing curriculums, but can be trained together in the

following general courses:

Course 1

Maintaining
Adjusting
Repairing
Operating
Mixing
Installing
Calibrating
Selecting
Inspecting, testing, trouble shooting

Course 2

Feeds
Livestock
Animal nutrition
Dairy
Poultry
Animal diseases

Course 3

Business principles
Office procedures
Taxes
Insurance
Credit
Accounting
Salesmanship

Course 4

Sound and light
Electronics
Metallurgy
Mechanics
Designing
Remodeling
Sketching and drawing
Hydraulics
Heat

Course 5

Supervising others
Handling men(boss)
Appraising work of others
Training others
Inducting new personnel
Advising,consulting and diagnosing
Inspecting

Course 6

Architecture
Carpentry
Farm buildings
Sketching and drawing

Course 7

Writing articles, copy, etc.
Making speeches
Developing techniques

Course 8

Policy-making
Planning
Decision-making
Handling money
Promoting
Buying
Planning production or service

Course 9

Research procedures
Conducting research
Food processing

Course 10

Salesmanship
Meeting non-farm people
Meeting farm people
Estimating costs
Selling

Course 11

Advanced mathematics
Physics

Course 12

Insect and pest control
Plant diseases
Agricultural chemicals
Soils
Crops
Floriculture
Soil and water management
Horticulture

Course 13

Constructing equipment, tools (hand or power) supplies and instruments
Designing
Making and building
Assembling
Floriculture

Course 14

Shop work
Farm mechanization
Farm conveniences
Tractors and other power units
Testing
Agricultural economics
Electricity

Course 15

Filing
Inventorying
Rural recreation
Planning production or service
Keeping records and accounts

3. The study does not provide data which indicate the details needed within the general areas of knowledge. The narrative description obtained by the interviewers on each position interviewed should aid the curriculum planner in understanding how the knowledges are used in the jobs identified, but the curriculum planner must further refine the curriculum, and therefore will need to obtain more detailed information concerning the identified areas of knowledge and worker activities before units of instruction can be planned.

4. The level of need for activities and knowledges by workers in the job-titles indentified should have basic implications for the methodology of training programs. The instructional programs planned for the agricultural vocational jobs in the cluster should be more basic and general in nature than for courses which would train for agricultural-technical jobs in the same cluster. Persons preparing for all those agricultural technical jobs having a high factor loading should have courses which contain those activities and knowledges taught in a way that would be used on the job.

5. The in-school instructional programs at the vocational and technical levels should provide the broad theoretical base for the learning of applied principles and details in an on-the-job experience program as a part of the course of study. These on-the-job experience programs should be conducted at:

a) The high school level.

b) The university associate-degree level.

c) The multi-level area vocational and technical school level.

6. Advisory groups made up of educators and business representatives should evaluate these research findings, and advise the curriculum planner concerning the experience programs.

7. New vocational and technical programs should be designed to train persons to enter and advance in positions they now hold in Appalachia. Vocational agriculture programs at the high school level will need to be

redesigned in order to adequately train people to take entry positions in vocational jobs identified. These specialized courses in agriculture at the high school and post-high school level may be supported by other technical subjects taught in the comprehensive high school and post-high school institutions.

8. Since there is a high mobility of workers, and since the entry job may not be in the same geographical area where the second or third job may be located, there is justification for training for a "family" or cluster of jobs as is being recommended in the curriculum planning approach in this study.

9. This curriculum planning approach should have implications for guidance purposes, in that curriculums will provide basic education for all the job-titles included in a particular cluster or "family" of jobs.

10. New educational and guidance programs must re-orient the prospective employee to the idea that he need not seek employment in a readily identifiable agricultural business to find a job. As the study shows, persons with agricultural knowledge and skills are rather widely marketable in businesses that appear non-agricultural but employ people needing these knowledges and skills.

11. Financial support should be sought for well-planned pilot programs at the university associate-degree level, multi-level area vocational and technical school level, and high school vocational level in order to further refine and evaluate more detailed curriculums.

SELECTED BIBLIOGRAPHY

1. Agan, R. J. "Study of Non-Farm Agricultural Occupations in Kansas," Department of Agricultural Education, Kansas State University, Manhattan, Kansas, 1963. 27pp.

2. Agricultural Experiment Station. *Family Ties, Migration, and Transitional Adjustment of Young Men from Eastern Kentucky*, Bulletin Number 691, College of Agriculture, University of Kentucky, Lexington, Kentucky, May, 1964. 39 pp.

3. Agricultural Experiment Station. *Career Placement and Economic Life Chances of Young Men from Eastern Kentucky*, Bulletin Number 686, College of Agriculture, University of Kentucky, Lexington, Kentucky, January, 1964. 34 pp.

4. Baker, R. A. "A Study of Employment Opportunities in Off-Farm Agricultural Occupations in Alabama," Department of Vocational, Technical and Practical Arts Education, Auburn University, Auburn, Alabama, 1965.

5. Barwick, R. P. "Identification of Off-Farm Agricultural Occupations," *Preliminary Report, Agricultural Education Publication Number 3.*, School of Agriculture, University of Delaware, Newark, Delaware, 1965. 38 pp.

6. Bingham, William R. "Agricultural Occupations Other Than Farming in Selected Kentucky Counties, with Implications for Vocational Education," Thesis, Ph. D., University of Kentucky, Lexington, Kentucky, 1964.

7. Binkley, Harold R. "Non-Farm Agricultural Occupations in Selected Kentucky Counties with Implications for the Vocational Training That May Be Provided," Department of Vocational Education, College of Education, University of Kentucky, Lexington, Kentucky.

8. Blackman, J. H. and Dawson. C. G. "Need for Training for Non-Farming Agriculture Occupations," Vocational Division, North Carolina Department of Public Instruction, Raleigh, North Carolina, 1961. 58 pp.

9. Brown, Bert L. "Training Needs of Workers in Businesses Associated with Agriculture," Washington State Board of Vocational Education, Olympia, Washington, 1959. 25 pp.

10. Bundy, C. E. and Blake, D. L. "Competencies in Agriculture Needed by Males Employed in Off-Farm Agricultural Occupations," Cooperative Study State Department of Education, and Iowa Agriculture and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, and the Vocational Agriculture Section, State Department of Public Instruction, Des Moines, Iowa, 1965.

11. Christensen, Howard H. "Employment Opportunities in Selected Non-Farm Businesses and Government Agencies as Related to Agricultural Training or Background, Nevada, 1965," Agricultural Economics and Education Department, University of Nevada, Reno, Nevada, 1965. 96 pp. (Preliminary Report)

12. Clark, R. M. "Training for Non-Farm Agricultural Occupations," The Agricultural Education Magazine, October, 1960. p. 84

13. Courtney, Elwood Wayne, "A Comparison of Knowledge and Experience Levels Required in Three Agricltural Occupations," Thesis, Ed. D., Purdue University, Lafayette, Indiana, 1962. 80 pp.

14. Edington, E. D. and Stevenson, B. W. "Determining Training and Educational Needs for Persons Employed in Agricultural Occupations in Oklahoma," Cooperative Study College of Agriculture, Oklahoma State University, and the Oklahoma State Department of Vocational Education, Stillwater, Oklahoma, 1964. 89 pp.

15. Foster, Paul J. "A Study of Agricultural Occupations Other Than Farming and Ranching In Colorado," State Board for Vocational Education, Denver, Colorado, 1965. 41 pp. (Prelimary Report)

16. Freier, E. E. "The Minnesota Agricultural Off-Farm Occupational Opportunities and Training Needs," Mankato Area Vocational-Technical School, Mankato, Minnesota, May, 1965. 42 pp.

17. Hoover, Norman K., McClay, David R., and Stevens, Glenn Z. "Off-Farm Agricultural Occusptions in Pennsylvania," Joint Study-Department of Agricultural Education, The Pennsylvania State University, University Park, and the Division of Agricultural Education, Pennsylvania State Department of Public Instruction, Harrisburg, Pennsylvania, Teacher Education Research Series, Volume VII, Number 1, 1966. 36 pp.

18. Hoover, Norman K., McClay, David R., and Stevens, Glenn Z. "Technical Education Needs of Persons Engaged in Agricultural Occupations,"Joint Study-Department of Agricultural Education, The Pennsylvania State University, University Park, and the Division of Agricultural Education, Pennsylvania State Department of Public Instruction, Harrisburg, Pennsylvania, 1965.

19. Judge, Homer V. "Employment Opportunities and Needed Competencies in Off-Farm Agricultural Occupations in Massachusetts," Massachusetts Department of Education, Division of Vocational Education, Boston, 15, Massachusetts, June, 1965. 47 pp.

20. Kennedy, William H. "A Clarification of Relationships Between Farming and Certain Other Agricultural Occupations with Implications for Guidance and Curriculum Development," Thesis, Ed. D., Michigan State University, East Lansing, Michigan, 1958. 528 pp.

21. Leslie, John D. and Gates, Gary R. "Training Needs in Central Kentucky," Spindletop Research Center, Lexington, Kentucky, 1966. 81 pp.

22. Mondart, C. L. and Curtis, C. M. "Occupational Opportunities and Training Needs for Non-Farm Agricultural Jobs in the Metropolitan Areas of Louisiana," Vocational Agriculture Education Number 6, School of Vocational Education, College of Agriculture, Louisiana State University, Baton Rouge, Louisiana, 1965.

23. Occupational Criteria and Preparatory Curriculum Patterns in Technical Education Programs, Vocational Division Bulletin Number 296, U. S. Department of Health, Education and Welfare, 1962, 26 pp.

24. Phipps, Lloyd, J. et. al. "Technical Education in and for Rural Areas," Agricultural Education Division, Vocational and Technical Education Department, College of Education, University of Illinois, Urbana, Illinois, 1964. 74 pp.

25. Policy for Skilled Manpower, National Manpower Council, Columbia University Press, New York, 1954.

26. Richardson, Burl B. and Edington, Everett D. "The Training Needed for Selected Farm Related Occupations in Four Counties in Oklahoma," Oklahoma State University, Stillwater, Oklahoma, 1964. 35 pp.

27. Schank, Dean R. "A Study of the Off-Farm Agriculture Occupations of Utah's Salt Lake and South Davis Counties to Determine Educational Needs," Department of Agricultural Education, Utah State University, Logan, Utah, 1964. 55 pp.

28. Thompson, Orville, E. "Training Requirements of Workers in the Production and Distribution of Nursery Products," University of California, Davis, California, 1959. 33 pp.

29. Vocational Education for American Industry, U. S. Department of Health, Education and Welfare, U. S. Office of Education, Circular Number 530, 1958. p.8.

APPENDIX A

RANDOM SAMPLE OF TELEPHONE EXCHANGES IN STRATA 1
IN 38 COUNTY AREA IN EASTERN KENTUCKY
AND SOUTHERN OHIO

Telephone Exchange No. In Sample	Telephone Exchange No. In Strata 1	Prefix	Exchange Name	State
1	58	PR 8	South Webster	Ohio
2	31	738	Sandy Hook	Kentucky
3	04	874	Allen	Kentucky
4	89	795	Aberdeen	Ohio
5	86	386	Seaman	Ohio
6	53	456	Freeburn	Kentucky
7	61	CH 7	Letart Falls	Ohio
8	51	353	Stone	Kentucky
9	64	WI 9	Racine	Ohio
10	65	MO 9	Wilkesville	Ohio
11	57	DR 2	Otway	Ohio
12	25	882	Dover	Kentucky
13	68	583	Leo	Ohio
14	94	245 & CH 5	Rio Grande	Ohio
15	78	876	Felicity	Ohio
16	41	672	Chapman	Kentucky
17	54	NONE	Sadieville	Kentucky
18	28	668	Campton	Kentucky
19	75	379	Hammersville	Ohio
20	76	442	Mowrystown	Ohio
21	56	493	Idaho	Ohio
22	90	643	Arabia	Ohio
23	01	398	Buckhorn	Kentucky

Page 2 continued

Telephone Exchange No. In Sample	Telephone Exchange No. In Strata 1	Prefix	Exchange Name	State
24	47	447	Topmost	Kentucky
25	93	256 or A16	Guyal	Ohio
26	2	295	Canoe	Kentucky
27	73	375	Higginsport	Ohio
28	29	725	Ezel	Kentucky
29	40	686	Fallsburg	Kentucky
30	36	835	Fedscreek	Kentucky

RANDOM SAMPLE OF TELEPHONE EXCHANGES IN STRATA 2
IN THE 38 COUNTY AREA IN EASTERN KENTUCKY
AND SOUTHERN OHIO

Column 647, Row 12
Page 193, (Statistical
analysis)

Exhange No. In Sample	Exhange No. in Strata	Prefix	Exchange Name	State
1	46	544	West Union	Ohio
2	15	473	Greenup	Kentucky
3	16	836	Flatwoods	Kentucky
4	4	886	Prestonsburg	Kentucky
5	27	237	South Williamson	Kentucky
6	23	638	Louisa	Kentucky
7	44	444	Mt. Orab	Ohio
8	24	349	Salyersville	Kentucky
9	39	763	Bethel	Ohio
10	26	654	Falmouth	Kentucky
11	22	9	Wheelright	Kentucky
12	25	824	Williamstown	Kentucky
13	18	YE 2	South Shore	Kentucky
14	37	894	Burlington	Ohio
15	41	752 & 794	Tobasco	Ohio

RANDOM SAMPLE OF TELEPHONE EXCHANGES IN STRATA 3
IN 38 COUNTY AREA OF EASTERN KENTUCKY
AND SOUTHERN OHIO

Telephone Exchange In the Sample	Telephone Exchange In Strate 3	Prefix	Exchange Name	State
1	12	393	Hillsboro	Ohio
2	03	987	Paris	Kentucky
3	14	532	Ironton	Ohio
4	07	EL 4 or EL 3	Portsmouth	Ohio
5	02	234	Cynthiana	Kentucky
6	05	324	Ashland	Kentucky

APPENDIX B

TYPES OF NON-FARM AGRICULTURAL BUSINESSES IN THE 38 COUNTY REGION OF STUDY IN EASTERN KENTUCKY AND SOUTHERN OHIO

Code 1 Column 6 on Card

Yellow Page Headings

Acetylene
Agricultural Implements
Animal Boarding
Animal Breeders Supplies
Animal Dealers - Pets
Animal Food
Animal Hospitals
Ant Exterminating
Acquariums & Supplies
Architects-Landscape
Artificial Insemination Service
Baby Chicks
Bait
Bird Barriers, Repellents & Controls
Bird Proofing
Birds, Animals, Etc.
Black Earth
Blacksmiths
Building Materials
Buildings-Pre-Cut & Prefabricated
Bulbs-Flowering
Cats-Boarding
Cattle
Chicken Hatcheries
Creameries
Dairy Equipment
Dairy Products
Dairy Supplies
Dirt
Dog & Cat Hospitals
Dog Kennels
Dog Training
Dogs - Grooming
Eggs-Retail
Eggs-Wholesale
Engines
Evergreens
Exterminating & Fumigating
Farm Equipment
Farm Lands
Farm Management Service
Farms

Types of Non-Farm Agricultural Businesses, Code 1
Page 2 Continued

Butchers

Butter

Camps-Tourist

Canaries

Cat Hospitals

Fishing Bait-Live

Fishing Lakes

Florists-Retail

Florists-Wholesale

Foresters

Fountains-Garden, Display

Fuel Oil

Fumigation

Garden Furnishings

Garden Stores

Garden Tractors

Goat's Milk

Flour Mills

Gold Fish

Grass Seeds

Grass Sod

Greenhouses

Hatcheries

Horse Dealers

Horseshoes

Farms Rent or Sale

Feed Dealers

Feed Water Heaters

Fence

Fertilizers

Manure

Meat Packers

Moth Exterminators

Milk

Nurseries-Grower

Nurserymen

Oils-Fuels

Oils-Petroleum

Pest Control Service

Pet Foods

Pet Hospitals

Pet Shops

Petroleum Products

Ponies

Poultry

Poultry Food

Produce

Rat Exterminators

Riding Saddles

Roach Exterminating

Types of Non-Farm Agricultural Businesses , Code 1
Page 3 continued

Insecticides & Pest Control Products

Insect Exterminators

Insemination Service-Artificial

Irrigation Systems & Equipment

Kennels

Landscape Service

Lawn Construction

Lime

Livestock Foods

Rock Gardens

Sales Stables

Sawmills

Seeds & Bulbs-Retail

Seeds & Bulbs-Wholesale

Shrubbery

Silverfish Exterminating

Slaughtering Service

Sod

Soil

Spraying Equipment

Squabs

Stables

Stock Farms

Stock Yards

Termite Control

Tobacco Products

Tobacco Rehandlers

Tobacco Warehouses

Top Soil

Tractors

Tree Service

Trees

Tropical Fish, Gold Fish

Vermin Exterminating

Veterinarians

TYPES OF NON-AGRICULTURAL BUSINESSES WITH POSSIBILITIES OF HAVING WORKERS USING AGRICULTURAL KNOWLEDGE IN THE 38 COUNTY REGION OF STUDY IN EASTERN KENTUCKY AND SOUTHERN OHIO

Code 2 Column 6 on Card

Yellow Page Headings

- Accountants-Certified Public
- Accountants-Public
- Accounting & Bookkeeping Form
- Accounting & Pookkeeping Systems
- Accounting Machines
- Accounting Schools
- Accounting Systems-Pegboard
- Acids
- Acoustic Instruments
- Acoustical Contractors
- Adjusters
- Advertising Agencies & Counselors
- Advertising Copy Writers
- Advertising-Directory
- Advertising Specialties
- Air Compressors
- Air Compressors-Rental
- Air Conditioning Contractors
- Air Conditioning Equipment-Cleaning and Repairing
- Air Purifying Equipment
- Aluminum Fabricators
- Aluminum Welding
- Amusement Parks
- Analytical Laboratories
- Angle Iron
- Appraisers
- Arbor Presses
- Archery Equipment & Supplies
- Architects
- Argon
- Artesian Well Contractors
- Ash Removal
- Asphalt Applying Contractors
- Associations
- Asylums
- Auctioneers
- Automobile Filling Stations
- Automobile Garages
- Automobile Graveyards
- Automobile Repair Service

Workers Using Agricultural Knowledge, Code 2
Page 2 continued

Alkalies

Backhoes

Bacteriological Laboratories

Banks

Basement Contractors

Black Top

Boat Harbors

Bookkeeping Service

Bottled Gas

Boxes-Paper

Brazing Equipment & Supplies

Brick-Common, Face, Etc.

Bridges-Builders

Brokers

Builders' Hardware

Builders-Home

Building Maintenance-Cleaning

Building Maintenance-Repairing

Building Movers

Bulldozers

Bulletin & Directory Boards

Bureaus

Burial Vaults

Butchers' Equipment & Supplies

Butter Substitutes

Automobile Repairing & Service
Equipment

Automobile Service Station

Camping Equipment & Supplies

Camping Trailers

Camps-Trailer

Camps-Vacation

Canoes

Carpenters

Catch Basin Cleaning

Cement Blocks

Cement Contractors

Cement Mixes-Dry

Cement-Portland

Cemeteries

Certified Public Accountants

Cheese

Chemicals-Manufactors & Distributors

Chemists Analytical & Consulting
Chlorinators

Churches

Cinder Blocks

Cinders

Cisterns

City Government Offices

Clubs

Coal Analysis

Workers Using Agricultural Knowledge, Code 2
Page 3 continued

Butter-Wholesale

Cabins-Pre-Cut & Prefabricated

Cafes

Cafeterias

Calcimine

Calcimining Contractors

Concrete Precast

Concrete Ready Mixed

Concrete Weatherproofing

Condiments & Sauces

Confectionery-Whol. & Mfrs.

Construction Companies

Contractors, Elevators

Contractors' Equipment & Supplies

Contractors-General

Convalescent Homes

Convents

Cooperage

Core Drilling Contractors

County Offices

Crawler Track Machines

Cruises

Cylinder Grinding

Damp-Proofing Contractors

Dead Animal Removers

Department Stores

Cold Storage

Concrete & Cement Contractors

Concrete & Cement Spraying Equipment

Concrete & Cement Spraying Materials

Concrete Construction Materials

Concrete Forms & Ties

Concrete Mixes-Dry

Dump Truck Hauling

Dynamotors

Electric Contractors

Electric Light & Power Companies

Electric Motors-Dealers & Repairers

Electric Welding

Electric Wiring

Electricians

Engines-Gasoline

Engines-Diesel

Excavating Contractors

Exterminating & Fumigating Supplies

Factory Sites

Federal Government

Filling Stations-Automobile

Films-Motion Pictures

Firewood

Fish-Retail

Flour Analysis

Workers Using Agricultural Knowledge , Code 2
Page 4 continued

Diesel Fuel

Distilleries

Ditch Digging Machinery

Dog & Cat Foods

Dog & Cat Furnishings

Dog Houses

Drilling Contractors

Driveways

Druggists-Retail

Druggists' Sundries-Wholesale

Freezers-Food

Freezers Food Locker Service
Frozen Foods
Fruit Juices

Fruits & Vegetables-Retail

Furniture Fumigating

Garage Builders

Garages-Pre-Cut- & Prefabricated

Garages-Private-Ready Cut

Gas-Bottled

Gas Companies

Gas-Liquified Petroleum

Gasoline Filling Stations

Gasoline-Wholesale

General Contractors

General Stores

Golf Courses-Public

Fly Spray

Food Analysts

Food Brokers

Food Lockers-Refrigerated

Food Marts

Food Products Mfrs.

Food Service Equipment

Food Supplements

Foods-Frozen

Foods-Gourmet

Foods Ready to Serve

Foundation Contractors

Foundation Soundings

Hitches-Trailer

HomeImprovements

Homes

Homes-Pre-Cut & Prefabricated

Horse Transportation

Horse Trailers

Hospitals

Houses-Pre-Cut & Prefabricated

Hunting-Birds, Game, Etc.

Ice Cream

Ice Cream Mixes

Insect Powder

Insurance

Workers Using Agricultural Knowledge, Code 2
Page 5 continued

Government-U.S. Offices
Grading Contractors
Grate Wood
Grocers-Retail
Grocers-Wholesale
Hangars-Steel
Hardware-Retail
Hardware-Whol.& Mfrs.
Hardwoods
Harness & Saddlery
Headstones
Hitches
Lunch Rooms
Lumber-Wholesale
Mail-order House
Mason Contractors
Meat Dealers-Retail
Meat Dealers-Wholesale
Meat-Frozen
Meat Saws
Memorial Parks
Metal Buildings
Milk Analysis
Mixes-Ice Cream
Motels
Mortgages

Insurance Adjusters
Insurance Consultants
Insurance Inspection
Insurance Surety & Fidelity
Insurance Title
Kerosene
Kindling
Laboratories-Analytical
Laboratories-Biological
Lawn Furniture
Lawn Mowers
Lawn Movers-Sharpening & Repairing
Leather Goods-Whol.& Mfrs.
Light and Power Companies
Lightning Rods
Loans
Loans-Real Estate
Lumber-Retail
Pharmacists
Pigeon Proofing
Pipe
Pipe-Sewer
Plumbers
Plumbing Contractors
Portable Buildings
Potato Chips

Workers Using Agricultural Knowledge , Code 2
Page 6 continued

Motor Courts

Mowers-Lawn

Notaries

Nursing Homes

Oil

Oil Analysis

Oil Distributors

Oil Exploration

Oiling-Road

Oil Well Drilling

Oleomargarine

Paint

Paint Spraying

Paints-Retail-Whol.& Mfrs .

Paper Mfrs.

Paper Products

Pest Control Service

Pet Show Supplies

Road Material

Rubbish Removal

Rust Preventives

Saddlery

Saddles

Salt

Sand & Gravel

Sanitariums

Poultry-Frozen

Pre-Cut Buildings

Precast Concrete

Prefabricated Buildings

Prescription Laboratories

Process Piping

Property Management

Proprietary Medicines

Public Accountants

Race Tracks

Railroads

Rat Poison

Ready Cut Buildings

Real Estate

Real Estate Appraisers

Real Estate Auctioneers

Real Estate Loans

Real Estate Management

Real Estate Records

Refuse Removal

Restaurants

Rest Homes

Retirement Systems

Retreading & Recapping-Tires

Riding Academies

Roach Powder

Workers Using Agricultural Knowledge
Page 7 continued

- Sausages
- Service Stations-Automobile
- Sewer Construction Contractors
- Sheds
- Shopping Centers
- Shrimp
- Sightseeing Trips
- Spumoni
- State Offices
- Steel Buildings
- Steps-Concrete
- Stone-Crushed
- Stone-Natural
- Stone-Cut
- Survey Stakes
- Surveyors
- Sweepers-Electric
- Swimming Pools-Private
- Swimming Pools-Public
- Tax Matters
- Tax Return Preparation
- Telegraph Companies
- Telegraph Flower Delivery Services
- Test Borings
- Road Builders
- Road Oiling
- Testing Laboratories
- Tires-Dealers
- Tires-Repairing-Recapping
- Title Companies
- Tourists' Agencies
- Tours
- Travel Bureaus
- Truck Dealers
- Trucking
- Trust Companies
- United States Government
- Variety & Sundries Stores
- Vegetable Stores
- Vegetables-Fresh-Frozen
- Water Analysis
- Water Dealers
- Water Companies
- Water Hauling
- Water Heaters
- Water Supply Systems
- Welding
- Welding Equipment & Supplies
- Well Contractors
- Well Drilling

Wheelwrights

Wood Dealers

Wood Work

Yard Goods

APPENDIX C

_____ Interviewer Identification Code ___ _____ ____ ____ ____ _____
1-D 2-4TE 5-PS 6-TB 7-AC 8-10F

Date ______________________

EMPLOYMENT OPPORTUNITIES AND AGRICULTURAL COMPETENCIES STUDY
STAFF STUDY IN AGRICULTURAL TECHNOLOGY
Morehead State College

FORM 1

I Name of Company of Firm ____

____

II Address of Firm ____

Name of Person Contacted ____________________ Tele.______________

______III-IV Position in Company of Person Interviewed 1. Owner 2. Owner- Manager 3. Manager-hired 4. Personnel director 5. Sales Manager 6. Office Manager 7. Other (specify) ________________________

V Functions of Company

_____12 Manufacturing
_____13 Purchasing
_____14 Service
_____15 Constructing
_____16 Retailing
_____17 Warehouse
_____18 Processing
_____19 Wholesaling
_____20 Contractor
_____21 Other (specify) ________

VI Products, Services or Functions of Company

____

____

____

____

____

VII Type of Business

_ _ _22-24 Percentage of business agricultural oriented

_ _ _25-27 Percentage of business non-agricultural

VIII

_ _ _28-30 Total number of workers (owners and employees)

FORM 1

1-D 2-4TE 5-PS 6-TB 7-AC 8-10F

IX Present and Anticipated job titles, and number of workers in each.

			Number Normally Employed Last Calendar Year		Number of New Workers Likely To Be Employed In:			
			Full Time 38-40	Part Time 41-43	Next 3 Year Period		Next 5 Year Period (1970)	
31-34 JT	35-37 BJT Code	Job Title			Full Time 44-46	Part Time 47-49	Full Time 50-52	Part Time 53-55
___	---	___	---	---	---	---	---	---
___	---	___	---	---	---	---	---	---
___	---	___	---	---	---	---	---	---
___	---	___	---	---	---	---	---	---
___	---	___	---	---	---	---	---	---
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___	---	___	---	---	---	---	---	---
___	---	___	---	---	---	---	---	---
___	---	___	---	---	---	---	---	---

Identification Code

1-D 2-4TE 5-PS 6-TB 7-AC 8-10F 11-14JT 15-17BJT

____ Interviewer

EMPLOYMENT OPPORTUNITIES AND AGRICULTURAL COMPETENCIES STUDY
STAFF STUDY IN AGRICULTURAL TECHNOLOGY
Morehead State College

Form 2

I Name and Adress of Firm ____________________

____

II Job Title ____________________

III Alternative Titles ____________________

IV Source and Location of Job in Company Dept., etc. ____________________

____

____18-19 V _ _ _ _ _ _ _ _ _ _ _ _ _ _

____20-21 VI Number of Workers with title

VII Activities and Duties of Persons with this Job Title

VIIA Working with People Outside Firm
- ____22 Meeting Farm people
- ____23 Meeting non-farm people
- ____24 Selling
- ____25 Advising, consulting and diagnosing
- ____26 Estimating costs
- ____27 Buying
- ____28 Other (specify) ____________

Clarification Comments

____
____
____
____
____

VIIB Working with Personnel in Firm
- ____29 Handling men (boss)
- ____30 Inducting new personnel
- ____31 Training others
- ____32 Appraising work of others
- ____33 Supervising others
- ____34 Other (specify) ____________

VIIC Working with Production, Products, Materials, or Service

- ____35 Designing
- ____36 Making and building
- ____37 Sketching and drawing
- ____38 Mixing
- ____39 Assembling
- ____40 Inspecting
- ____41 Testing
- ____42 Calculating costs
- ____43 Conducting research
- ____44 Using technical and service manuals, parts lists
- ____45 Developing techniques
- ____46 Planning production or service
- ____47 Other (specify)

Clarification Comments

____
____
____
____
____
____
____
____
____

Form 2

____ 5-Ps ____ 6-TB ____ 7-AC ____ 8-10F ____ 11-14JT ____ 15-17BJT

VIID Working with Firm's or Customers; Equipment, Tools (hand or power) Supplies and Instruments

____48 Constructing above
____49 Designing
____50 Repairing
____51 Operating
____52 Assembling
____53 Calibrating
____54 Remodeling
____55 Adjusting
____56 Maintaining
____57 Inspecting, Testing, Trouble Shooting
____58 Installing
____59 Selecting
____60 Other (specify) ____________

Clarification Comments

____
____
____
____
____
____

VIIE Working with Business Problems

____61 Policy-making
____62 Planning
____63 Promoting
____64 Handling money
____65 Keeping records and accounts
____66 Writing articles, copy, etc.
____67 Making speeches
____68 Filing
____69 Inventorying
____70 Making tech. reports
____71 Reading tech. reports
____72 Decision making
____73 Other (specify)

Clarification Comments

____
____
____
____
____
____

DECK 3:

VIII Areas with which Worker MUST Be Familiar to do Job

____18 Soils
____19 Soil and water management
____20 Crops
____21 Horticulture
____22 Floriculture
____23 Livestock
____24 Poultry
____25 Dairy
____26 Feeds
____27 Animal nutrition
____28 Animal diseases
____29 Plant diseases
____30 Tractors and other power units
____31 Electricity
____32 Farm mechanization
____33 Shop work
____34 Carpentry
____35 Farm buildings
____36 Farm conveniences
____37 Agricultural Economics
____38 General Agriculture and rural life knowledge
____39 Agricultural chemicals
____40 Insect and pest control
____41 Forestry
____42 Food processing
____43 Rural recreation
____44 Credit
____45 Insurance
____46 Taxes
____47 Accounting
____48 Business principles
____49 Office procedures
____50 Salesmanship

____51 Chemistry
____52 Physics
____53 Advanced Mathematics
____54 Foreign Language
____55 Research procedures
____56 Electronics
____57 Mechanics
____58 Sound and light
____59 Hydraulics
____60 Metallurgy
____61 Heat
____62 Architecture
____63 Other (specify) ____________

FORM 2

Clarification Comments

DECK 4:

IX Prerequisties of Job

____18 Work experience required
____19 Prior to acceptance of job
____20 On-Job-Training

Clarification Comments

_ _21 Are there specific policy limitations on ages for employment? If so, what:

5-PS 6-TB 7-AC 8-10F 11-14JT 15-17BJT

____22 Education - minimum formal schooling required

1. Less than 4 years
2. Less than 8 years
3. Less than 12 years
4. High school graduate
5. Less than 16 years
6. College graduate or more

X Employment Opportunities

_ _ _23-25 Total number of different persons with this job title employed in the past five years
_ _ 26-27 Anticipated additional persons with job-title needed in the next 3 year (1968) period due to growth and turnover.
_ _ 28-29 Anticipated additional persons with job-title needed in five years (1970) due to growth and turnover. (Includes those in 26-27 above).
_ _ _30-32 Percentage of employees with this job-title obtained nearby (within 25 miles).
_ _ _33-35 Percentages of employees with this job-title obtained from a distance (beyond 25 miles).

Clarification Comments

FORM 3

_____ Interviewer

Code 1-D 2-4TE 5-PS 6-TB 7-AC 8-10F 11-14JT 15-17BJT

XI SUMMARY DESCRIPTION OF JOB

Job Title ____

Description of activities and duties:

Description of level of job, interesting characteristics, and miscellaneous comments:

_____36 Is this a technician level job: Explain why, if not explained above.

_____37 Is this an agricultural oriented job: Explain why, if not explained above.

THE 92 ACTIVITY AND KNOWLEDGE VARIABLES ON WHICH DATA WERE GATHERE.

STAFF STUDY IN AGRICULTURE TECHNOLOGY

MOREHEAD STATE UNIVERSITY
MOREHEAD, KENTUCKY

Working with People Outside Firm

1. Meeting farm people
2. Meeting non-farm people
3. Selling
4. Advising, consulting and diagnosing
5. Estimating costs
6. Buying

Working with Personnel in Firm

7. Handling men (boss)
8. Inducting new personnel
9. Training others
10. Appraising work of others
11. Supervising others

Working with Production, Products, Materials or Service

12. Designing
13. Making and building
14. Sketching and drawing
15. Mixing
16. Assembling
17. Inspecting
18. Testing
19. Calculating costs
20. Conducting research
21. Using technical and service manuals, parts lists
22. Developing techniques
23. Planning production or service

Working with Firm's or Customers; Equipment, Tools (hand or power) Supplies and Instruments

24. Constructing above
25. Designing
26. Repairing
27. Operating
28. Assembling
29. Calibrating
30. Remodeling
31. Adjusting
32. Maintaining
33. Inspecting, Testing, Trouble Shooting
34. Installing
35. Selecting

Working with Business Problems

36. Policy-making
37. Planning
38. Promoting
39. Handling money
40. Keeping records and accounts
41. Writing articles, copy, etc.
42. Making speeches
43. Filing
44. Inventorying
45. Making tech. reports
46. Reading Tech. reports
47. Decision making

THE 92 ACTIVITY AND KNOWLEDGE VARIABLES ON WHICH DATA WERE GATHERED- continued

STAFF STUDY IN AGRICULTURE TECHNOLOGY

MOREHEAD STATE UNIVERSITY
MOREHEAD, KENTUCKY

Areas with Which Worker MUST Be Familiar to Do Job

48 Soils
49 Soil and water management
50 Crops
51 Horticulture
52 Floriculture
53 Livestock
54 Poultry
55 Dairy
56 Feeds
57 Animal nutrition
58 Animal diseases
59 Plant diseases
60 Tractors and other power units
61 Electricity
62 Farm mechanization
63 Shop work
64 Carpentry
65 Farm Buildings
66 Farm Conveniences
67 Agricultural Economics
68 General Agriculture and rural life knowledge
69 Agricultural chemicals
70 Insect and pest control
71 Forestry
72 Food processing
73 Rural recreation
74 Credit
75 Insurance
76 Taxes
77 Accounting
78 Business principles
79 Office procedures
80 Salesmanship
81 Chemistry
82 Physics
83 Advanced Mathematics
84 Foreign Language
85 Research procedures
86 Electronics
87 Mechanics
88 Sound and Light
89 Hydraulics
90 Metallurgy
91 Heat
92 Architecture

APPENDIX D

CODING INSTRUCTIONS

Staff Study in Agricultural Technology
Morehead State University

Column Number for DECKS 1; 2; 3; 4:	Description	Code
1	Deck Number	1. Form 1 2. Form 2 (worker activities) 3. Form 2 (worker knowledge) 4. Form 2 & 3 worker employment opportunities and skill level)
2-3-4:	Telephone Exchange	Number of telephone exhanges in the sample of exchanges.
5	Population Stratum	1. Exchange with largest town 1,000 or less people. 2. Exchange with largest town 1,000-5,000 people. 3. Exchange with largest town over 5,000 people.
6	Type of Business	1. Off-farm agricultural business 2. Non-agricultural business with possibilities for agriculturally oriented jobs.
7	Agricultural-Business Category: 1. Horticulture 2. Livestock 3. Crops and Soils 4. Agricultural Education 5. Agricultural Economics 6. Agricultural Engineering 7. Poultry	

Column Number	Description	Code
8 - 9 - 10	Firm Number	Actual firm number in the final random sample of businesses
DECK 2:		
1 - 10	Job Identification	Same as for DECK 1
11 - 12	Job Title Code	Code actual number from coding sheet
13 - 14	Business Code	Code actual number from coding sheet
15 - 17	Best Job Title	Code actual number from coding list of new titles (See Appendix E)
18 - 19	Blank	
21 - 21	Number of workers with title	Code actual number
22 - 73	Activities and duties of persons with this job title	Code each column: 0=does not perform the activity 1=performs the activity "some", "little" 2=performs the activity "much", "often".
DECK 3:		
1 - 17	Job Identification	Same as for DECKS 2 and 3
18 - 63	Areas of knowledge with which worker must be familiar to do job.	Code each column: 0=does not use the knowledge in his job 1=Uses the knowledge "some" or "little" in job 2=Uses knowledge "much" or "often" in his job.
DECK 4:		
1 - 17	Job Identification	Same as for DECKS 2 and 3

Column Number	Description	Code
18	Pre-requisites of Job: Work experience required.	0=none required 1=required
19	Work experience required prior to acceptance of job.	0=No 1=Yes
20	On-job training required.	0=NO 1=Yes
21	Specific policy on limitations on ages for employment.	0=No 1=Yes
22	Education-minimum formal schooling required.	1=Less than 4 yrs. 2=Less than 8 yrs. 3= Less than 12 yrs. 4=High School graduate 5=Less than 16 yrs. 6=College Graduate or more
23 - 25	Total number of different persons with this job.	Code Actual Number
26- 27	Anticipated additional persons with job title needed in next three years. (1968) due to growth and turnover.	Code actual number
28 -29	Number of additional persons with job title needed in next five yrs. (1970)due to growth and turnover. Includes those in 26-27 above.	Code actual number
30 -32	Percentage of employees with this job title obtained nearby (within 25 miles).	Code actual percentage
33 - 35	Percentage of employess with this job title obtained from a distance (beyond 25 miles).	Code actual percentage
36	Technician level job.	0=No 1=Yes
37	Agriculturally Oriented Job.	0=No 1=Yes

CODING INFORMATION FOR COLUMNS 11-12

JOBS

01	Adjuster
02	Advertising manager
03	Agent
04	Agronomist
05	Applier
06	Assistant
07	Baker
08	Biological aide
09	Boiler repairman
10	Broker
11	Butcher
12	Buyer
13	Candler
14	Caretaker
15	Carpenter
16	Clerk
17	Custodian
18	Demonstrator
19	Designer
20	Director
21	Distributor
22	Draftsman
23	Elevator man
24	Electrician
25	Engineer
26	Farm credit adviser
27	Field Agent
28	Field director
29	Fieldman
30	Fire chief
31	Foreman
32	Inseminator
33	Lab technician
34	Line man
35	Machinist
36	Maintenance helper
38	Mechanic
39	Metal works man
40	Manager hired
41	Mill foreman
42	Millman
43	Mill manager
44	Nurseryman
45	Office manager
46	Operator
47	Order clerk
48	Owner
49	Owner-manager
50	Packer
51	Parts man
52	Plant breeder
53	Plant manager - Production manager
54	Plumber
55	Purchasing agent
56	Poultry dresser
57	Quality control supervisor
58	Repairman
59	Salesman
60	Sales manager
61	Sales research
62	Secretary - Bookkeeper
63	Seed cleaner
64	Seed grader
65	Seed processor
66	Serviceman
67	Service supervisor
68	Set-up-man
69	Sheet metal fabricator
70	Shop foreman
71	Superintendent
72	Supervisor
73	Trainer
74	Truck driver
75	Welder
76	Worker
77	Yard manager
78	Professional
79	Cook
80	Instructor - teacher
81	Livestock grader - selector
82	Chasier
83	Surveyor
84	Weighman-Selector
85	Collector agents
86	Ranger - Parks - Forests

CODING INFORMATION FOR COLUMNS 13-14

BUSINESSES

01	Aerial Spraying Company
02	Agriculture Market Service, USDA
03	Artificial Insemination
04	Auto Repair Company
05	Cement Company, Manufacturing and Sales
06	Chemical Company
07	Cob Company
08	Corn Products Company
09	Crushed Stone Company
10	Dairy Sales Company
11	Egg Company
12	Electrical Appliance Company
13	Electronic Repair Company
14	Elevator Company
15	Excavating Company
16	Engineering Company
17	Farm Machinery Repair Company
18	Finance Company
19	Hatchery
20	Feed Mill and Feed Company
21	Feed Manufacturing Company (Wholesale)
22	Fertilizer Applicator Company
23	Farm Supply Company
24	Fertilizer Company
25	Florists Company
26	Fire Department
27	Gladiolus Co-op
28	Fuel Distributing (Service Station or Wholesale)
29	Greenhouse
30	Grocery Company
31	Hardware Company
32	Highway Division
33	Implement Company
34	Insurance Company
35	Investment Company
36	Landscaping and Tree Service Company
37	Legal Company
38	Light Company
39	Linotype
40	Livestock Commission Company - Market Sales
41	Locker Company
42	Lumber Company
43	Machine Shop
44	Metal Works Company (Sheet-metal)
45	Newspaper
46	Packing Company
47	Painting Contractor
48	Pest Control Company
49	Plumbing Company
50	Printing Company

CODING INFORMATION FOR COLUMNS 13-14 continued

51	Poultry Company
52	Produce Company (green vegetable, etc.)
53	Purchasing Agent
54	Railroad Company
55	Ready-Mix Concrete Company
56	Real Estate Company
57	Restaurant
58	Riding Stables
59	Road Construction
60	Roofing and Siding Company
61	School
62	Seed Company
63	Silo Manufacturing Company
64	Soil Testing
65	Sod Company
66	Telephone Company
67	Tool Company
68	Trucking Company
69	Vegetable Producing Company
70	Paper Products Company
71	Veterinarian Service
72	Water Works Company
73	Welding Company
74	Construction Company
75	Government Offices
76	Building Supplies
77	Auto dealers
78	Recreation
79	Variety Store - general
80	Tire Service
81	Fruit market
82	Sporting Goods & Bait
83	Nursing Home
84	Hotel and Motel
85	Church
86	Meat Markets
87	Horse Farm
88	Laundry and Cleaning
89	Warehouse
90	Managerial Companies
91	Clothing Store
92	Supermarket
93	Drug Company Store
94	Appliance Store
95	Auto Parts and Accessories
96	Bank
97	Electric Light and Power Company
98	Department Store
99	Club - social, service, lodges, etc.

APPENDIX E

Summary of Descriptive Job Titles
for the study
entitled

EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHA

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

The job titles were first recorded as given to the interviewers. These job titles constitute a list of some 736 titles. The following list of "descriptive" job titles was compiled on the basis of the job description summations for each job as written by the interviewers.

In preparing this summary, the "descriptive" job titles were first divided into the following nine categories:

I. Agricultural machinery and construction jobs
II. Feed mill and elevator jobs
III. General agricultural sales and service jobs
IV. Horticultural jobs
V. Livestock marketing jobs
VI. Poultry marketing and service jobs
VII. Seed and fertilizer jobs
VIII. Miscellaneous agricultural jobs
IX. Non-agricultural jobs

Within each type of job category, the titles were then subclassified according to the following kinds of jobs:

A. Directors of development, production, control and sales
B. Machine and equipment operators
C. Inspection, Testing, and Construction-Mechanics and repair man
D. Salesmen
E. Secretaries and clerks
F. Supervisors
G. Miscellaneous

The Summary

I. Agricultural Machinery and Construction Jobs

A. Directors

Consecutive Number	BJT	Job Titles
1	001	General Director and large farm building construction, farm equipment, sales, and lumber company.
2	003	General Director of farm equipment repair and manufacturing company.
3	004	General Director of small farm building, farm equipment, and lumber company.
4	006	General Director of garage and farm equipment repair company.
5	007	General Director of excavation company for farm construction.
6	012	General Director of farm machinery and equipment sales and service co., including automobile and truck sales and service.
7	014	Director of Aluminum siding company.
8	015	Director of building and road construction company.

B. Machine and Equipment Operators

Consecutive Number	BJT	Job Titles
9	021	Truck driver and yard worker for small farm building farm equipment, lumber, and coal company.

C. Inspection, Testing, and Construction-Mechanics and Repairmen

Consecutive Number	BJT	Job Titles
10	027	Carpenter for lumber and farm building construction company.
11	033	Head mechanic and salesman for farm, machinery, and equipment company

Consective Number	BJT	Job Title
12	034	Mechanic for farm machinery, farm equipment, automobile, and truck company.
13	035	Mechanic for automobile, tractor, and power unit repair company.
14	036	Welder for machine and welding company including farm equipment repair.
D. Salesmen		
15	043	Salesman for farm silo construction, lumber, and farm building company.
16	044	Salesman for farm machinery, automobile and truck, equipment sales and service, and feed company.
17	045	Parts salesman for farm machinery, automobile, and truck sales company.
E. Secretaries and Clerks		
18	052	Clerk and bookkeeper for small farm building, farm equipment, and lumber company.
19	053	Clerk for road construction.
F. Supervisors		
20	058	Shop foreman for farm building construction, farm equipment, lumber and coal company.
21	059	Yard supervisor for small farm building, farm equipment, and lumber company.
22	060	Service supervisor for farm machinery company.
23	062	Shop foreman for farm machinery sales and service company.
24	063	Mill foreman for large farm building and lumber company.

Consecutive Number	BJT	Job Title
25	064	Office manager for farm machinery sales and service company.
II. Feed Mill and Elevator Jobs		
A. Directors		
26	081	General Director of feed and livestock supply company.
27	083	General Director of feed mill, farm supply store, and farm machinery sales and service.
28	084	General Director of grain elevator, and farm supply store.
29	086	General Director and mill operator for feed and farm supply store.
30	087	General Director for feed and coal distribution company.
B. Machine and Equipment Operators		
31	092	Millman for feed mill.
32	095	Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.
C. Inspection, Testing, and Construction-Mechanics and Repairmen		
33	101	Maintenance man for feed mill and grain elevator.
34	102	Mechanic for feed mill and farm and dairy supply company.
35	103	Seed Cleaning and inspection foreman for seed company.
D. Salesmen		
36	109	Salesman for feed mill and farm supply store.
E. Secretaries and Clerks		
37	114	Clerk in feed mill and farm supply store.

Consecutive Number	BJT	Job Title
F. Supervisors		
38	120	Outside foreman for grain elevator, feedmill, farm supply, and farm machinery sales company.
G. Miscellaneous		
39	127	Warehouse man for feed mill, farm supply, fertilizer, and lumber company.
III. General Agricultural Sales and Service Jobs		
A. Directors		
40	137	Director of general farm supply and service company.
41	141	General Director of distributing company for farm fuels, petroleum products, tires and batteries.
42	146	General Director of hardware store, and feed mill.
43	147	General Director and manager of tobacco warehouse company.
44	148	General manager for coal, fuel, limestone, and ceptic tank installation company.
45	149	General manager real estate company.
B. Machine and Equipment Operators		
46	154	Truck driver for distributor of farm fuel, petroleum, limestone, ceptic tanks, tires, and batteries.
D. Salesmen		
47	169	Farm salesman and deliveryman for farms petroleum products and chemicals company.
48	170	Salesman in feed and farm supply store.

Consecutive Number	BJT	Job Title
E. Secretaries and Clerks		
49	180	Office worker in tobacco warehouse company.
50	181	Secretary in real estate office.
F. Supervisors		
51	186	Foreman in tobacco warehouse company.
G. Miscellaneous		
52	195	General worker in farm supply and service company.
53	196	Weighman and general worker in tobacco warehouse company.
IV. Horticultural Jobs		
A. Directors		
54	206	General Director of vegetable producing company.
55	207	General Director of wholesale vegetable produce and sales company.
56	208	General Director of retail florist shop.
57	209	General Director of landscaping, florist, and greenhouse business.
58	210	General Director of florist and greenhouse business.
B. Salesman		
59	237	Clerk and bookkeeper for nursery and florist shop.
F. Miscellaneous		
60	263	Floral designer.

Consecutive Number	BJT	Job Title
61	264	Deliveryman for retail florist shop.
62	265	Worker in wholesale vegetable produce company.
63	266	Worker for vegetable producing company.
64	267	Worker for landscaping and greenhouse business.
V. Livestock Marketing Jobs		
A. Directors		
65	276	Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.
66	278	General Director for livestock marketing cooperative.
67	279	General Director of livestock auction company.
68	282	General Director and distributor for wholesale and retail dairy products, meat, and grocery company.
69	283	General Director of ice-cream and dairy products company.
70	284	Office director of livestock marketing cooperative.
B. Machine and Equipment Operators		
71	291	Truck driver for livestock marketing and auction company.
72	292	Truck driver for dairy products, meat, and grocery company.
73	293	Bottling machine operator for dairy products company.

Consecutive Number	BJT	Job Title
C. Inspection, Testing and Construction-Mechanics and repairmen		
74	301	Freezer inspection man for dairy products company.
75	302	General maintenance man for wholesale and retail meat and grocery company.
D. Salesmen		
76	311	Route salesman for wholesale and retail dairy products, meats, and grocery company.
77	312	Waitress of Ice-cream and dairy bar.
E. Secretaries and Clerks		
78	321	Sales clerk for dairy products company.
79	322	Bookkeeper in livestock sales company.
F. Supervisors		
80	329	Salesman-supervisor of dairy products, meat, and grocery company.
G. Miscellaneous		
81	342	Contact man for livestock auction company.
82	343	Yardman for stockyard and feeder cattle business.
83	344	Grader for livestock cooperative.
84	345	Weighman in livestock sales company.
VI. Poultry Marketing and Service Jobs		
A. Directors		

Consecutive Number	BJT	Job Title
85	359	General Director for egg buying, grading, and wholesale and retail company.
B. Machine and Equipment Operators		
86	366	Plant process man for poultry processing company.
C. Salesmen		
87	380	Salesman for egg, poultry, and poultry processing company.
E. Secretaries and Clerks		
88	~~407~~ 396	Secretary and clerk for egg, poultry, and poultry processing company.
F. Miscellaneous		
89	407	Hatchery operator and breed selection man-poultry company.
90	408	Candler for egg company.
91	409	Packer for egg company.
92	410	Truck driver and pick-up man for wholesale and retail egg company.
93	411	General worker in egg and poultry processing company.
VII. Seed and Fertilizer Jobs		
A. Directors		
94	423	General Director for fertilizer and limestone company.
VIII. Miscellaneous Agricultural Jobs		
A. Directors		
95	511	General Director of fuel distribution and service company.

Consecutive Number	BJT	Job Title
96	512	General Director for Insurance Company.
97	513	General Director of hardware, electrical and building supply, paint, and wallpaper company.
98	514	General Director of restaurant and liquors store.
99	516	General Director of pest control company.
100	517	Service Director of pest control company.
101	519	General Director of show and riding academy, horse farm, and hospital.
102	521	General Director of rural grocery and variety store.
103	522	General Director of rural grocery store.
104	523	General Director of slaughter and meat processing company.
105	524	General Director of food locker company.
106	526	General Director of farm painting company.
107	527	General Director roofing and sheet metal company.
108	528	General Director of service station, tractor and truck repair shop.
109	530	Director, farm management company.
110	531	Director of 4-H camp.
111	532	Director of live bait store.
112	533	Director retail meat and grocery store.

Consecutive Number	BJT	Job Title
113	534	Director of restaurant and bus depot.
114	535	Director of service station, oil, and gas drilling company.
115	536	Sales manager for hardware, electrical, plumbing, and building supply store.
116	537	General Director of washing machine sales and service company.
117	538	Owner and manager of bar.
118	539	General manager of public utilities and fuel distribution company.
119	540	General Director of state police district station.

B. Machine and Equipment Operators

Consecutive Number	BJT	Job Title
120	562	Mechanic in washing machine sales and service company.
121	563	Service man and mechanic in hardware store.
122	564	Maintenance man in state park.

C. Inspection, Testing and Construction Mechanics and Repairman

Consecutive Number	BJT	Job Title
123	581	Station attendant and automobile and truck tractor repairman.
124	584	Shipping manager for hardware, building, plumbing , and electrical supply company.

D. Salesmen

Consecutive Number	BJT	Job Title
125	596	Life insurance agent.
126	597	Salesman in pest control company.
127	598	Salesman in live bait store.
128	599	Salesman in hardware, building, plumbing, and electrical supply company.

Consecutive Number	BJT	Job Title
129	600	Salesman in washing machine sales and service company.
130	601	Sales manager for insurance company.
131	602	Sales manager for painting and decorating company.
E. Secretaries and Clerks		
132	611	Clerk in electrical, building-supply, hardware-supply, paint, and wallpaper company.
133	612	Clerk for grocery and variety store.
134	613	Sales clerk and bookkeeper in retail meat store and meat processing company.
135	614	Clerk in feedmill.
136	615	Secretary for service station, gas and oil drilling company.
137	616	Cashier in grocery store and bank.
F. Supervisors		
138	623	Job supervisor for painting and decorating company.
139	624	Produce and meats manager in grocery supermarket.
G. Miscellaneous		
140	631	Route serviceman for pest control company.
141	632	Meat cutter for supermarket.
142	633	Butcher for frozen food locker and meat processing company, including sausage making and boning.
143	634	Caretaker in show and riding academy, including horse trainer on horse farm.

Consecutive Number	BJT	Job Title
144	636	Claims adjuster for insurance company.
145	637	Foreman for horse rehabilation farm and horse hospital.
146	638	Attendant-service station, oil and gas drilling, and bulk plant company.
147	639	Conservation instructor in 4-H camp.
148	640	Crew foreman in pest control company.
149	641	Exercise boy and groomboy for horse rehabilitation farm and horse hospital.
150	642	Laborer and deliveryman in washing machine sales and service company.
151	643	Carryout, deliveryman, and general worker in supermarket-grocery store.
152	644	Produce man in supermarket-grocery store.
153	645	Painter in painting and decorating company.
154	646	Ranger in State Park.
155	647	Naturalist in State Park.

IX. Non-Agricultural Jobs

A. Directors

156	661	General Director for heating and plumbing company.
157	663	General Director for welding company.
158	665	General Director for auto parts, sales and service company.

Consecutive Number	BJT	Job Title
159	666	General Director of limestone and crushed stone company.
160	667	General Director of printing and photography company.
161	672	Superintendent of water department treatment plant.
162	676	Contractor in construction and machine-rental company.
163	677	General Director of construction, truck repair service, sales, and gasoline company.
164	678	General Director of automobile sales and service company.
165	679	General Director of ready mix concrete and concrete block company.
166	680	General Director of grease equipment, tire sales, and service company.
167	681	General Director of garage and service station.
168	682	General Director and district distributor in petroleum bulk plant.
169	683	General Director of motor company.
170	684	General Director of musical-amusement company.
171	685	General Director of drug company.
172	686	Manager of petroleum developing company.
173	687	General Director of laundry and dry cleaning company.
174	688	Agent for insurance company.

Consecutive Number	BJT	Job Title
175	689	County treasurer.
176	690	Grade school principal.
177	691	Executive Vice-President of Bank.
178	692	Distribution agent in feed testing company.
179	693	General Director of bank and finance company.
180	694	General director of hotel.
181	695	General Director of refrigeration equipment company.
182	696	General Director of paper products company.
183	697	Postmaster.
184	698	General Director for nursing home.
185	699	General Director of clothing store.

B. Machine and Equipment Operators

Consecutive Number	BJT	Job Title
186	721	Truck driver and engineer for building-materials, and motor freight company.
187	723	Heavy machinery operator for county engineer construction company.
188	724	Truck driver for L.P. Gas and petroleum distribution company.
189	727	Steam shovel and heavy machinery operator for stone and cement company.
190	728	General Director for furniture company.
191	729	Delivery and maintenance man for petroleum products company.

Consecutive Number	BJT	Job Title
192	730	Truck driver and set-up-man for musical amusement company.
193	731	Welder for welding company.
194	732	Machine operator-clerk for laundry and dry cleaning company.
195	733	Truck driver for laundry and dry cleaning company.
196	734	Machine operator for concrete company.
197	735	Mechanic for county engineer, car and truck garage.
198	737	Machine operator in paper products company.

C. Inspection, Testing and Construction-Mechanics and Repairman

Consecutive Number	BJT	Job Title
199	769	Mechanic for auto sales and service company.
200	770	Service station attendant and automobile mechanic.
201	773	Mechanic for stone company.
202	774	Welder for stone company.
203	775	Bodyman for automobile-truck, and farm machinery company.
204	777	Serviceman for furnaces company.
205	778	Independent brick layer.
206	779	Plumber for plumbing company.
207	780	Electrician for plumbing company.
208	781	Personnel director.
209	782	Maintenance man in hotel.
210	783	Serviceman for clothing department store.

Consecutive Number	BJT	Job Title
211	791	Automobile salesman.
212	792	Salesman and deliveryman for tire sales and service company.
213	793	Salesman for car-truck sales and service company.
214	794	Credit collection representative for loan company.
215	795	Salesman for paper products company.
216	796	Salesman-clerk for clothing department store.
E.	Secretaries and Clerks	
217	811	Clerk for public utilities company.
218	812	Legal Secretary and receptionist for legal company.
219	813	Clerk for state forestor and county engineer's office.
220	814	Clerk for drug store.
221	815	Clerk for laundry and dry cleaning company.
222	816	Secretary for probation and parole office.
223	817	Clerk-teller-cashier in bank, post office, and savings and loan company.
224	818	Clerk in railroad station.
225	819	Secretary in Government Food Inspection Office.
226	820	Clerk in automobile and truck parts store.
227	821	Order and inventory clerk in paper products company.

Consecutive Number	BJT	Job Title
228	822	Secretary and treasurer in construction and machinery rental company.
229	823	Clerk for cement company.
F.	Supervisors	
230	826	Shop foreman for construction and machinery rental company.
231	827	Project supervisor, construction, pipeline, and power line company.
232	830	Foreman of highway maintenance for state department of highways.
233	831	Plant foreman for stone and concrete block company.
234	832	Product Salesman and Office Manager for stone company.
235	833	Foreman for freight company.
236	834	Sales manager for concrete block company.
237	835	Garage superintendent for county engineer.
238	836	Road and bridge superintendent for county engineer.
239	837	Time keeper for county engineer.
240	838	Plant superintendent in paper products company.
241	839	Trustee for masonic foundation.
242	840	Paymaster in post office.
G.	Miscellaneous	
243	853	Meter-serviceman for public utilities company.
244	857	Custodian for public school system, state park, church, hotel, nursing home, and department store.

Consecutive Number	BJT	Job Title
245	861	Oiler for stone company.
246	862	Trucker for stone company.
247	863	Dynamite driller for stone company.
248	864	Bellboy and lifeguard in vacation resort.
249	865	Cook for camp, school, restaurant or nursing home.
250	866	Boiler operator for meat packing business.
251	867	Waitress, carhop or waiter, in restaurant.
252	868	Pipeline crew man for oil company.
253	869	Truck driver for hardware, plumbing, electrical and builders supply company.
254	870	Station agent for railroad.
255	871	Church mission worker.
256	872	Probation parole officer.
257	873	Survey crew man for county engineer.
258	874	Bartender.
259	875	Desk clerk in hotel.
260	876	Laborer in construction and machinery rental company.
261	877	Mailman in post office.
262	878	Nurse in nursing home.
263	879	Clerk and bookkeeper for legal firm.
264	880	Kiln attendant in cement company.

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Consecutive Number	BJT	Job Title
265	881	Time keeper in cement company.
266	882	Field service worker for health department.
267	883	Controller in Department store.

APPENDIX F

AGRICULTURAL JOB TITLES REPRESENTED BY 306 AGRICULTURALLY-ORIENTED JOB POSITIONS

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

Consecutive Number	BJT	Job Title
1	001	General Director of large farm building construction, farm equipment, sales, and lumber company.
2	004	General Director of small farm building, farm equipment, and lumber company.
3	012	General Director of farm machinery and equipment sales, and service company, including automobile and truck sales, and service.
4	014	Director of Aluminum siding company.
5	021	Truck driver and yard worker for small farm buidling, farm equipment, lumber and coal company.
6	027	Carpenter for lumber and farm building construction company.
7	033	Head mechanic and salesman for farm machinery and equipment company.
8	034	Mechanic for farm machinery, automobile and truck company.
9	035	Mechanic for automobile, tractor, and power unit repair company.
10	043	Salesman for farm silo construction, lumber,and farm building company.

Consecutive Number	BJT	Job Title
11	044	Salesman for farm machinery, automobile and truck, equipment sales and service, and feed company.
12	045	Parts salesman for farm machinery, automobile and truck sales company.
13	052	Clerk and bookkeeper for small farm building, farm equipment, and lumber company.
14	058	Shop foreman for farm building construction farm equipment, lumber, and coal company.
15	060	Service supervisor for farm machinery company.
16	062	Shop foreman for farm machinery sales and service company.
17	064	Office manager for farm machinery sales and service company.
18	081	General Director of feed and livestock supply company.
19	083	General Director of feed mill, farm supply store, and farm machinery sales and service.
20	084	General Director of grain elevator and farm supply store.
21	086	General Director and mill operator for feed and farm supply store.
22	087	General Director for feed and coal distribution company.
23	092	Millman for feed mill.
24	095	Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.

Consecutive Number	BJT	Job Title
25	101	Maintenance man for feed mill and grain elevator.
26	102	Mechanic for feed mill, farm and dairy supply company.
27	103	Seed cleaning and inspection foreman for seed company.
28	109	Salesman for feed mill and farm supply store.
29	114	Clerk in feed mill and farm supply store.
30	120	Outside foreman for grain elevator, feedmill, farm supply, and farm machinery sales company.
31	127	Warehouse man for feed mill, farm supply, fertilizer, and lumber company.
32	137	Director of general farm supply and service company.
33	146	General Director of hardware store and feed mill.
34	147	General Director and manager of tobacco warehouse company.
35	149	General manager real estate company.
36	170	Salesman in feed and farm supply store.
37	180	Office worker in tobacco warehouse company.
38	195	General worker in farm supply and service company.
39	196	Weighman and general worker in tobacco warehouse company.
40	206	General Director of vegetable producing company.

Consecutive Number	BJT	Job Title
41	207	General Director of wholesale vegetable produce and sales co.
42	208	General Director of retail florist shop.
43	209	General Director of landscaping, florist, and greenhouse business.
44	210	General Director of florist and greenhouse business.
45	237	Clerk and bookkeeper for nursery and florist shop.
46	263	Floral designer.
47	264	Deliveryman for retail florist shop.
48	265	Worker in wholesale vegetable produce company.
49	266	Worker for vegetable producing company.
50	267	Worker for landscaping and greenhouse business.
51	276	Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.
52	278	General Director for livestock marketing cooperative.
53	279	General Director of livestock auction company.
54	282	General Director and distributor for wholesale and retail dairy products, meat, and grocery company.
55	283	General Director of ice-cream and dairy product company.
56	284	Office director of livestock marketing cooperative.

Consecutive Number	BJT	Job Title
57	291	Truck driver for livestock marketing and auction company.
58	292	Truck driver for dairy products, meat, and grocery company.
59	293	Bottling machine operator for dairy products company.
60	301	Freezer inspection man for dairy products company.
61	311	Route salesman for wholesale and retail dairy products, meat, and grocery company.
62	312	Waitress of Ice-cream dairy bar.
63	322	Bookkeeper in livestock sales company.
64	342	Contact man for livestock auction company.
65	343	Yardman for stockyard and feeder cattle business.
66	344	Grader for livestock cooperative.
67	345	Weighman in livestock sales company.
68	359	General Director for egg buying, grading, and wholesale-retail company.
69	366	Plant process man for poultry, processing company.
70	380	Salesman for egg, poultry, poultry processing company.
71	407	Hatchery operator and breed selection man for poultry company.
72	410	Truck driver and pick-up man for wholesale-retail egg company.

Consecutive Number	BJT	Job Title
73	411	General worker in egg and poultry processing company.
74	423	General Director for fertilizer, and lime stone company.
75	511	General Director of fuel distribution and service company.
76	512	General director for Insurance company.
77	513	General Director of hardware, electrical and building supply, paint, and wallpaper company.
78	514	General Director of restaurant and liquors store.
79	516	General Director of pest control company.
80	517	Service director of pest control company.
81	519	General Director of show and riding academy, horse farm and hospital.
82	521	General Director of rural grocery and variety store.
83	522	General Director of grocery store.
84	523	General Director of slaughter and meat processing company.
85	528	General Director of service station, tractor and truck repair shop.
86	530	Director. farm management company.
87	533	Director retail meat and grocery store.

Consecutive Number	BJT	Job Title
88	536	Sales manager for hardware, electrical, plumbing and building supply store.
89	539	General manager of public utilities and fuel distribution company.
90	540	General Director of state police district station.
91	564	Maintenance man in state park.
92	584	Shipping manager for hardware, building, plumbing, and electrical supply company.
93	596	Life insurance agent.
94	597	Salesman in pest control company.
95	601	Sales manager for insurance company.
96	612	Clerk for grocery and variety store.
97	613	Sales clerk and bookkeeper in retail meat store and meat processing company.
98	614	Clerk in feedmill.
99	616	Cashier in grocery store and bank.
100	624	Produce and meat manager in grocery-supermarket.
101	631	Route serviceman for pest control company.
102	632	Meat cutter for supermarket.
103	633	Butcher for frozen food locker and meat processing company, including sausage making boning.

Consecutive Number	BJT	Job Title
104	634	Caretaker in show and riding academy, including horse trainer on horse farm.
105	636	Claims adjuster for insurance company.
106	637	Foreman for horse rehabilitation farm and horse hospital.
107	639	Conservation instructor in 4-H camp.
108	641	Exercise boy and groom boy for horse rehabilitation farm and horse hospital.
109	644	Produce man in supermarket-grocery store.
110	647	Naturalist in State Park.
111	661	General Director for heating and plumbing company.
112	679	General Director of ready mix concrete and concrete block company.
113	681	General Director of garage and service station.
114	682	General Director and district distributor in petroleum bulk plant.
115	683	General Director of motor company.
116	688	Agent for insurance company.
117	698	General Director for nursing home.
118	770	Service station attendant and automobile mechanic.
119	777	Serviceman for furnace company.
120	779	Plumber for plumbing company.

Consecutive Number	BJT	Job Title
121	780	Electrician for plumbing company.
122	831	Plant foreman for stone and concrete block company.
123	832	Product salesman and office manager for stone company.
124	857	Custodian for public school system, state park, church, hotel, nursing home, and department store.
125	865	Cook for camp, school, restaurant, or nursing home.
126	882	Field service worker for health department.

APPENDIX G

AGRICULTURAL-TECHNICIAN JOB TITLES REPRESENTED BY 122 AGRICULTURALLY ORIENTED TECHNICAL JOB POSITIONS

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

Consecutive Number	BJT Code No. (15, 16, 17)	Job Title
1	001	General director of large farm building construction, farm equipment, sales, and lumber company.
2	004	General director of small farm building construction, farm equipment, sales, and lumber company.
3	012	General director of farm machinery and equipment sales and service company, automobile and truck sales and service.
4	021	Truck driver and yard worker for small farm building equipment, lumber and coal company.
5	027	Carpenter for lumber and farm building construction company.
6	033	Head mechanic and salesman for farm machinery, and equipment company.
7	034	Mechanic for farm machinery, farm equipment, automobile, and truck company.
8	035	Mechanic for automobile, tractor, and power unit repair company.
9	044	Salesman for farm machinery, automobile and truck, equipment sales and service, and feed company.
10	060	Service supervisor for farm machinery company.
11	062	Shop foreman for farm machinery sales and service company.
12	064	Office manager for farm machinery sales and service company.
13	083	General director of feed mill, farm supply store, and farm machinery sales and service.
14	086	General director and mill operator for feed and farm supply store.
15	092	Millman for feed mill.
16	095	Truck driver and helper for feed mill.
17	101	Maintenance man for feed mill and grain elevator.
18	102	Mechanic for feed mill and farm and dairy supply company.
19	103	Seed cleaning and inspection foreman for seed company.
20	109	Salesman for feed mill and farm supply store.
21	120	Outside foreman for grain elevator, feedmill, farm supply, and farm machinery sales company.

Consecutive Number	BJT Code No. (15, 16, 17)	Job Title
22	137	Director of general farm supply and service company.
23	196	Weighman and general worker in tobacco warehouse company.
24	208	General director of retail florist shop.
25	209	General director of landscaping, florist, and greenhouse business.
26	210	General director of florist and greenhouse business.
27	237	Clerk and bookkeeper for nursery and florist shop.
28	263	Floral designer.
29	267	Worker for landscaping and greenhouse business.
30	282	General director and distributor for wholesale and retail dairy products, meat, and grocery company.
31	292	Truck driver for dairy products, meat, and grocery company.
32	301	Freezer inspection man for dairy products company.
33	343	Yardman for stockyard and feeder cattle business.
34	344	Grader for livestock cooperative.
35	359	General director of wholesale and retail egg-buying and grading company.
36	380	Salesman for egg, poultry, and poultry processing company.
37	407	Hatchery operator and breed selection man in a poultry company.
38	512	General director for insurance company.
39	513	General director of hardware, electrical and building supply, paint, and wallpaper company.
40	516	General director of pest control company.
41	517	Service director for pest control company.
42	519	General director of show and riding academy, horse farm, and hospital.
43	522	General director of grocery store.
44	523	General director of slaughter and meat processing company.
45	530	General director of a service station and farm management company.
46	533	Director of a retail meat and grocery store.
47	536	Sales manager for hardware, electrical, plumbing, and building supply store.
48	539	General manager of public utilities and fuel distribution company.
49	540	General director of state police district station.
50	614	Clerk in feed mill.

Consecutive Number	BJT Code No. (15, 16, 17)	Job Title
51	616	Cashier in grocery store and bank.
52	624	Produce and meats manager in grocery supermarket.
53	631	Route serviceman for pest control company.
54	632	Meat cutter for supermarket.
55	633	Butcher for frozen food locker and meat processing company, including sausage making and boning.
56	634	Caretaker in show and riding academy, including horse trainer on horse farm.
57	636	Claims adjuster for insurance company.
58	647	Naturalist in State Park.
59	661	General director for heating and plumbing company.
60	681	General director of garage and service station.
61	770	Service station attendant and automobile mechanic.
62	777	Serviceman for furnaces company.
63	779	Plumber for plumbing company.
64	780	Electrician for plumbing company.
65	831	Plant foreman for stone and concrete block company.
66	832	Product salesman and office manager for stone company.
67	857	Custodian for public school system, state park, church, hotel, nursing home, and department store.

APPENDIX H

ACTIVITY AND KNOWLEDGE FACTORS INDENTIFIED FOR 306 AGRICULTURALLY-ORIENTED JOB TITLES

Varimax Factor #1--Personnel Supervision and Business Management

Consecutive Number	Variable Number	Factor Loading	Activity or Knowledge
1	10	.919	Appraising work of others
2	11	.911	Supervising others
3	7	.907	Handling men
4	8	.875	Inducting new personnel
5	9	.841	Training others
6	37	.749	Policy-making
7	48	.739	Decision-making
8	38	.710	Planning
9	6	.706	Buying
10	77	.622	Taxes
11	36	.528	Selecting
12	24	.499	Planning prod. or service
13	20	.475	Calculating costs
14	45	.422	Inventorying

Varimax Factor #2--Mechanical Science and Technology

Consecutive Number	Variable Number	Factor Loading	Activity or Knowledge
1	32	.826	Adjusting
2	27	.776	Repairing
3	33	.755	Maintaining
4	34	.699	Inspecting,Testing,Trouble shooting
5	28	.641	Operating
6	30	.634	Calibrating
7	29	.615	Assembling
8	35	.573	Installing
9	31	.496	Remodeling
10	19	.432	Testing
11	16	.406	Mixing
12	18	.370	Inspecting
13	22	.260	Using technical & Service manuals, parts lists

Varimax Factor #3--Animal Science

Consecutive Number	Variable Number	Factor Loading	Activity or Knowledge
1	57	.880	Feeds
2	58	.864	Animal Nutrition
3	54	.842	Livestock
4	56	.805	Dairy
5	55	.768	Poultry
6	59	.723	Animal Diseases
7	74	.459	Rural recreation

Varimax Factor #4--Sales and Business Skills

1	3	.694	Selling
2	2	.680	Meeting Non-farm people
3	40	.667	Handling money
4	39	.636	Promoting
5	81	.617	Salesmanship
6	1	.585	Meeting farm people
7	41	.509	Keeping records and accounts
8	69	.461	Gen. Agr. and rural life knowledge
9	5	.430	Estimating costs

Varimax Factor #5--Plant and Soil Science

1	49	.808	Soils
2	60	.767	Plant Diseases
3	50	.765	Soil & water management
4	52	.768	Horticulture
5	70	.758	Agricultural chemicals
6	71	.706	Insect and pest control
7	51	.696	Crops
8	53	.688	Floriculture

Varimax Factor #6--Physical Science Technology

Consecutive Number	Variable Number	Factor Loading	Activity or Knowledge
1	91	.786	Metallurgy
2	87	.713	Electronics
3	89	.708	Sound & Light
4	88	.645	Mechanics
5	90	.596	Hydraulics

Varimax Factor #7--Technical and Business Communications

1	43	.757	Making speeches
2	42	.726	Writing articles,copy,etc.
3	46	.669	Making technical reports
4	23	.563	Developing techniques
5	47	.386	Reading technical reports

Varimax Factor #8--Agricultural Mechanics

1	63	.799	Farm mechanization
2	67	.726	Farm conveniences
3	61	.645	Tractors,other power units
4	68	.641	Agricultural economics
5	64	.615	Shop work

Varimax Factor #9--Building Design and Construction Technology

1	14	.705	Making and building
2	13	.693	Designing
3	25	.654	Constructing
4	17	.596	Assembling

Varimax Factor #10--Business Operation

Consecutive Number	Variable Number	Factor Loading	Activity or Knowledge
1	79	.672	Business principles
2	80	.660	Office procedures
3	78	.619	Accounting
4	75	.525	Credit
5	76	.514	Insurance

Varimax Factor #11--Farm Building Technology

1	66	.642	Farm building
2	62	.510	Electricity

Varimax Factor #12--Food Processing

1	73	.600	Food processing

Varimax Factor #13--Architectural Technology

1	93	.762	Architecture
2	15	.608	Sketching and drawing
3	65	.524	Carpentry
4	72	.422	Forestry

Varimax Factor #14--Physical Science Research

1	86	.780	Research procedures
2	83	.668	Physics
3	21	.598	Conducting research
4	82	.592	Chemistry

Varimax Factor #15--Mathematics

1	84	.627	Advanced mathematics

APPENDIX I

VARIMAX FACTOR COMPONENTS IN 12 JOB TITLE FACTORS

N = 126 Agricultural Job Titles

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

Management and Supervision Varimax Factor 1			
Rank	Variable Number	Factor Loading	Job Title
1	82	.909	General director of rural grocery and variety store.
2	54	.886	General director and distributer for wholesale and retail dairy products, meat, and grocery company.
3	2	.886	General director of small farm building, farm equipment, and lumber company.
4	116	.840	Agent for insurance company.
5	33	.820	General director of hardware store and feed mill.
6	115	.797	General director of motor company.
7	77	.793	General director of hardware, electrical and building supply, paint, and wallpaper company.
8	113	.781	General director of garage and service station.
9	3	.765	General director of farm machinery and equipment sales and service company, including auto and truck sales and service.
10	79	.755	General director of pest control company.
11	114	.748	General director and district distributer in petroleum bulk plant.
12	111	.739	General director for heating and plumbing company.
13	19	.735	General director of feed mill, farm supply store, and farm machinery sales and service.
14	63	.731	Bookkeeper in livestock sales company.
15	51	.729	Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.
16	81	.721	General director of show and riding academy, horse farm and hospital.
17	55	.720	General director of ice cream and dairy products company.
18	75	.720	General director of fuel distribution and service company.
19	34	.715	General director and manager of tobacco warehouse company.
20	42	.714	General director of retail florist shop.

Varimax Factor 1-continued:

Rank	Variable Number	Factor Loading	Job Title
21	68	.711	General director for egg-buying, grading and wholesale-retail company.
22	1	.703	General director of large farm building construction, farm equipment sales, and lumber company.
23	83	.702	General director of grocery store.
24	95	.698	Sales manager for insurance company.
25	40	.668	General director of vegetable producing company.
26	32	.658	Director of general farm supply and service company.
27	89	.653	General manager of public utilities and fuel distribution company.
28	43	.645	General director of landscaping, florist, and greenhouse business.
29	110	.640	Naturalist in State Park.
30	20	.634	General director of grain elevator and farm supply store.
31	78	.579	General director of restaurant and liquors store.
32	87	.566	Director of retail meat and grocery store.
33	22	.554	General director for feed and coal distribution company.
34	35	.552	General manager of real estate company.
35	76	.551	General director for insurance company.
36	17	.550	Office manager for farm machinery sales and service company.
37	4	.549	Director of aluminum siding company.
38	41	.546	General director of wholesale vegetable produce and sales company.
39	123	.520	Product salesman and office manager for stone company.
40	15	.518	Service supervisor for farm machinery company.
41	53	.516	General director of livestock auction company.
42	14	.482	Shop foreman for farm building construction, farm equipment, lumber and coal company.
43	112	.470	General director of ready mix concrete and concrete block company.
44	84	.469	General director of slaughter and meat processing company.
45	18	.453	General director of feed and livestock supply company.
46	94	.423	Salesman in pest control company.
47	52	.405	General director for livestock marketing cooperative.
48	80	.402	Service director of pest control company.
49	90	.401	General director of state police district station.

Varimax Factor 1-continued:

Rank	Variable Number	Factor Loading	Job Title
50	56	.386	Office director of livestock marketing cooperative.
51	93	.385	Life insurance agent.
52	88	.372	Sales manager for hardware, electrical, plumbing, and building supply store.
53	10	.360	General director and mill operator for feed and farm supply store.
54	96	.331	Clerk for grocery and variety store.
55	85	.322	General director of service station, tractor and truck repair shop.
56	58	.312	Truck driver for dairy products, meat, and grocery company.

Service and Mechanical
Varimax Factor 2

1	9	.811	Mechanic for automobile, tractor, and power unit repair company.
2	119	.805	Serviceman for furnace company.
3	26	.801	Mechanic for feed mill and farm and dairy supply company.
4	8	.787	Mechanic for farm machinery, farm equipment, automobile, and truck company.
5	7	.757	Head mechanic and salesman for farm machinery and equipment company.
6	120	.752	Plumber for plumbing company.
7	117	.728	General director for nursing home.
8	118	.678	Service station attendant and automobile mechanic.
9	39	.631	Weighman and general worker in tobacco warehouse company.
10	25	.617	Maintenance man for feed mill and grain elevator.
11	16	.603	Shop foreman for farm machinery sales and service company.
12	5	.558	Truck driver and yard worker for small farm building, farm equipment, lumber and coal company.
13	59	.534	Bottling machine operator for dairy products company.
14	98	.512	Clerk in feed mill.
15	101	.451	Route serviceman for pest control company.
16	60	.449	Freezer inspection man for dairy products company.
17	121	.434	Electrician for plumbing company.
18	105	.432	Claims adjuster for insurance company.

Varimax Factor 2-continued:

Rank	Variable Number	Factor Loading	Job Title
19	67	.431	Weighman in livestock sales company.
20	122	.350	Plant foreman for stone and concrete block company.
21	44	.327	General director of florist and greenhouse business.
22	36	.260	Salesman in feed and farm supply store.

Sales and Processing
Varimax Factor 3

1	107	.819	Conservation instructor in 4-H camp.
2	66	.778	Grader for livestock cooperative.
3	65	.740	Yardman for stockyard and feeder cattle business.
4	103	.705	Butcher for frozen food locker and meat processing company, including sausage making and boning.
5	23	.542	Millman for feed mill.
6	31	.513	Warehouse man for feed mill, farm supply, fertilzer, and lumber company.
7	102	.512	Meat cutter for supermarket.
8	28	.466	Salesman for feed mill and farm supply store.
9	27	.360	Seed cleaning and inspection foreman for seed company.

Service - Animal Science Oriented
Varimax Factor 4

1	108	.603	Exercise boy and groom boy for horse rehabilitation farm and horse hospital.
2	106	.580	Foreman for horse rehabilitation farm and horse hospital.
3	64	.548	Contact man for livestock auction company.
4	109	.537	Produce man in supermarket grocery store.
5	126	.524	Field service worker for health department.
6	86	.520	Director of farm management company.
7	38	.519	General worker in farm supply and service company.
8	71	.304	Hatchery operator and breed selection man for poultry company.

Grower-Processor - Plant Science Oriented
Varimax Factor 5

Rank	Variable Number	Factor Loading	Job Title
1	49	.776	Worker for vegetable producing company.
2	48	.662	Worker in wholesale vegetable produce company.
3	124	.597	Custodian for public school system, state park, church, hotel, nursing home, and department store.
4	47	.595	Deliveryman for retail florist shop.
5	57	.541	Truck driver for livestock marketing and auction company.
6	125	.536	Cook for camp, school, restaurant or nursing home.
7	69	.516	Plant process man for poultry processing company.
8	21	.439	General director and mill operator for feed and farm supply store.
9	24	.364	Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.
10	61	.288	Route salesman for wholesale and retail dairy products, meat, and grocery company.
11	97	.257	Sales clerk and bookkeeper in retail meat store and meat processing company.

Sales - Mechanics Oriented
Varimax Factor 6

1	11	.541	Salesman for farm machinery, automobile and truck equipment sales and service, and feed company.

Sales - Tobacco and Poultry Oriented
Varimax Factor 7

1	37	.566	Office worker in tobacco warehouse company.
2	70	.323	Salesman for egg, poultry, and poultry processing company.
3	72	.322	Truck driver and pick-up man for wholesale-retail egg company.

Service-Processor - Plant Science Oriented
Varimax Factor 8

Rank	Variable Number	Factor Loading	Job Title
1	50	.680	Worker for landscaping and greenhouse business.
2	29	.488	Clerk in feed mill and farm supply store.
3	30	.475	Outside foreman for grain elevator, feed mill, farm supply, and farm machinery sales company.
4	74	.416	General director for fertilizer and limestone company.
5	100	.382	Produce and meats manager in grocery supermarket.
6	109	.342	Produce man in supermarket grocery store.

Horticulture Oriented
Varimax Factor 9

Rank	Variable Number	Factor Loading	Job Title
1	104	.452	Caretaker in show and riding academy, including horse trainer on horse farm.
2	91	.359	Maintenance man in State Park.

Building and Construction Oriented
Varimax Factor 10

Rank	Variable Number	Factor Loading	Job Title
1	92	.671	Shipping manager for hardware, building, plumbing, and electricial supply company.
2	88	.388	Sales manager for hardware, electrical, plumbing, and building supply store.
3	6	.320	Carpenter for lumber and farm building construction company.

APPENDIX J

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

Job Title Cluster 1.
Management and Supervision - 56 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	33	.832	Maintaining
2	32	.785	Adjusting
3	27	.715	Repairing
4	28	.668	Operating
5	16	.563	Mixing
6	35	.519	Installing
7	30	.513	Calibrating
8	36	.466	Selecting
9	34	.453	Inspecting,testing, trouble shooting

Factor 2

1	57	.884	Feeds
2	54	.880	Livestock
3	58	.853	Animal nutrition
4	56	.818	Dairy
5	55	.817	Poultry
6	59	.769	Animal diseases

Factor 3

1	79	.859	Business principles
2	80	.819	Office procedures
3	77	.793	Taxes
4	76	.726	Insurance
5	75	.686	Credit
6	78	.639	Accounting
7	81	.546	Salesmanship

Factor 4

Rank	Row No.	Factor Loadings	Activity or Knowledge
1	89	.836	Sound and light
2	87	.815	Electronics
3	91	.777	Metallurgy
4	88	.703	Mechanics
5	26	.647	Designing
6	31	.598	Remodeling
7	15	.586	Sketching and drawing
8	90	.576	Hydraulics
9	92	.566	Heat

Factor 5

1	11	.913	Supervising others
2	7	.912	Handling men(boss)
3	10	.909	Appraising work of others
4	9	.837	Training others
5	8	.825	Inducting new personnel
6	4	.393	Advising,consulting, and diagnosing
7	18	.319	Inspecting

Factor 6

1	93	.759	Architecture
2	65	.718	Carpentry
3	66	.665	Farm buildings
4	15	.581	Sketching and drawing

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Management and Supervision - 56 titles, continued

Factor 7

Rank	Row No.	Factor Loading	Activity or Knowledge
1	42	.762	Writing articles, copy, etc.
2	43	.687	Making speeches
3	23	.670	Developing techniques

Factor 8

Rank	Row No.	Factor Loading	Activity or Knowledge
1	37	.795	Policy-making
2	38	.767	Planning
3	48	.740	Decision-making
4	40	.646	Handling money
5	39	.622	Promoting
6	6	.363	Buying
7	24	.311	Planning production or service

Factor 9

Rank	Row No.	Factor Loading	Activity or Knowledge
1	86	.801	Research procedures
2	21	.770	Conducting research
3	73	.432	Food processing

Factor 10

Rank	Row No.	Factor Loading	Activity or Knowledge
1	81	.571	Salesmanship
2	2	.553	Meeting non-farm people
3	1	.469	Meeting farm people
4	5	.447	Estimating costs
5	3	.436	Selling

Factor 11

Rank	Row No.	Factor Loading	Activity or Knowledge
1	84	.780	Advanced mathematics
2	83	.755	Physics

Factor 12

Rank	Row No.	Factor Loading	Activity or Knowledge
1	71	.760	Insect and pest control
2	60	.739	Plant diseases
3	70	.706	Agricultural chemicals
4	49	.664	Soils
5	51	.654	Crops
6	53	.526	Floriculture
7	50	.524	Soil and water management
8	52	.445	Horticulture

Factor 13

Rank	Row No.	Factor Loading	Activity or Knowledge
1	25	.760	Constructing equipment, tools(hand or power)supplies and instruments
2	13	.647	Designing
3	14	.585	Making and building
4	17	.487	Assembling
5	53	.484	Floriculture

Factor 14

Rank	Row No.	Factor Loading	Activity or Knowledge
1	64	.814	Shop work
2	63	.756	Farm mechanization
3	67	.726	Farm conveniences
4	61	.715	Tractors and other power units
5	19	.665	Testing
6	68	.580	Agricultural economics
7	62	.551	Electricity

Factor 15

Rank	Row No.	Factor Loading	Activity or Knowledge
1	44	.772	Filing
2	45	.727	Inventorying
3	74	.401	Rural recreation
4	24	.361	Planning production or service
5	41	.335	Keeping records and accounts

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Job Title Cluster 2.
Service and Mechanical - 22 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	70	.767	Agricultural chemicals
2	79	.766	Business principles
3	75	.748	Credit
4	81	.738	Salesmanship
5	39	.728	Promoting
6	40	.701	Handling money
7	71	.694	Insect and pest control
8	2	.659	Meeting non-farm people
9	69	.624	General agriculture and rural life knowledge
10	41	.511	Keeping records and accounts

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	67	.797	Farm conveniences
2	19	.788	Testing
3	61	.740	Tractors and other power units
4	64	.740	Shop work
5	35	.703	Installing
6	62	.691	Electricity
7	63	.682	Farm mechanization
8	17	.654	Assembling
9	68	.640	Agricultural economics

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	43	.932	Making speeches
2	46	.932	Making technical reports
3	25	.795	Constructing equipment, tools(hand or power) supplies and instruments
4	13	.786	Designing

Factor 3, continued

Rank	Row No.	Factor Loading	Activity or Knowledge
5	14	.745	Making and building
6	15	.724	Sketching and drawing
7	36	.608	Selecting
8	60	.587	Plant diseases

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	11	.946	Supervising others
2	10	.921	Appraising work of others
3	7	.858	Handling men(boss)
4	9	.743	Training others
5	6	.545	Buying

Factor 5

Rank	Row No.	Factor Loading	Activity or Knowledge
1	57	.915	Feeds
2	58	.832	Animal nutrition
3	55	.816	Poultry
4	51	.777	Crops
5	50	.721	Soil and water management
6	54	.717	Livestock
7	59	.618	Animal diseases
8	56	.606	Dairy
9	52	.565	Horticulture

Factor 6

Rank	Row No.	Factor Loading	Activity or Knowledge
1	77	.920	Taxes
2	78	.900	Accounting
3	44	.831	Filing
4	37	.807	Policy-making
5	53	.789	Floriculture
6	60	.682	Plant diseases
7	6	.638	Buying
8	52	.587	Horticulture
9	45	.567	Inventorying
10	76	.564	Insurance

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Service and Mechanical - 22 titles, continued

Factor 7

Rank	Row No.	Factor Loading	Activity or Knowledge
1	87	.883	Electronics
2	91	.650	Metallurgy
3	16	.612	Mixing
4	90	.545	Hydraulics
5	88	.427	Mechanics

Factor 8

Rank	Row No.	Factor Loading	Activity or Knowledge
1	30	.812	Calibrating
2	20	.747	Calculating costs
3	31	.736	Remodeling
4	92	.626	Heat
5	29	.551	Assembling
6	34	.508	Inspecting, testing, trouble shooting
7	88	.493	Mechanics
8	32	.435	Adjusting

Factor 9

Rank	Row No.	Factor Loading	Activity or Knowledge
1	47	.887	Reading technical reports
2	90	.525	Hydraulics

Factor 10

Rank	Row No.	Factor Loading	Activity or Knowledge
1	28	.843	Operating
2	23	.711	Maintaining
3	27	.704	Repairing
4	32	.508	Adjusting

Factor 11

Rank	Row No.	Factor Loading	Activity or Knowledge
1	65	.671	Carpentry

Factor 12

Rank	Row No.	Factor Loading	Activity or Knowledge
1	73	.897	Food processing
2	56	.714	Dairy

Factor 13

Rank	Row No.	Factor Loading	Activity or Knowledge
1	5	.672	Estimating costs
2	48	.571	Decision-making

Factor 14

Rank	Row No.	Factor Loading	Activity or Knowledge
1	18	.620	Inspecting

Factor 15

Rank	Row No.	Factor Loading	Activity or Knowledge
1	1	.534	Meeting farm people

Job Title Cluster 3.
Sales and Processing - 9 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	68	.907	Agricultural economics
2	70	.839	Agricultural chemicals
3	67	.814	Farm conveniences
4	79	.799	Accounting
5	71	.790	Insect and pest control
6	75	.788	Credit
7	63	.760	Farm mechanization
8	74	.758	Rural recreation
9	80	.742	Office procedures
10	38	.732	Planning
11	60	.724	Plant diseases
12	39	.694	Promoting
13	81	.660	Salesmanship
14	78	.636	Accounting
15	3	.602	Selling

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Sales and Processing - 9 titles, continued

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	9	.964	Training others
2	10	.964	Appraising work of others
3	8	.948	Inducting new personnel
4	7	.921	Handling men(boss)
5	11	.892	Supervising others
6	65	.630	Carpentry
7	64	.628	Shop work
8	45	.605	Inventorying
9	62	.564	Electricity

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	13	.947	Designing
2	73	.916	Food processing
3	23	.756	Developing techniques
4	20	.742	Calculating costs
5	29	.667	Assembling

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	26	.878	Making technical reports
2	47	.878	Reading technical reports
3	42	.853	Writing articles, copy, etc.
4	66	.753	Farm buildings
5	59	.606	Animal diseases
6	38	.573	Planning

Factor 5

Rank	Row No.	Factor Loading	Activity or Knowledge
1	77	.938	Taxes
2	76	.938	Insurance
3	78	.663	Accounting

Factor 6

Rank	Row No.	Factor Loading	Activity or Knowledge
1	40	.843	Handling money
2	53	.818	Floriculture
3	52	.732	Horticulture
4	81	.590	Salesmanship
5	3	.573	Selling
6	49	.509	Filing

Factor 7

Rank	Row No.	Factor Loading	Activity or Knowledge
1	31	.971	Remodeling
2	92	.971	Heat
3	35	.720	Installing
4	29	.681	Assembling
5	27	.520	Repairing

Factor 8

Rank	Row No.	Factor Loading	Activity or Knowledge
1	54	.737	Livestock
2	19	.608	Testing
3	4	.607	Advising, consulting and diagnosing

Factor 9

Rank	Row No.	Factor Loading	Activity or Knowledge
1	36	.852	Selecting
2	61	.706	Tractors and other power units
3	51	.651	Crops
4	64	.624	Shop work

Factor 10

Rank	Row No.	Factor Loading	Activity or Knowledge
1	24	.781	Planning production or service
2	41	.668	Keeping records and accounts
3	56	.650	Dairy
4	55	.639	Poultry
5	22	.556	Using technical and service manuals parts lists
6	69	.499	General agriculture and rural life knowledge

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Sales and Processing - 9 titles, continued

Factor 11

Rank	Row No.	Factor Loading	Activity or Knowledge
1	6	.931	Buying
2	5	.903	Estimating costs
3	48	.627	Decision-making

Factor 13

Rank	Row No.	Factor Loading	Activity or Knowledge
1	72	.841	Forestry
2	50	.754	Soil and water management
3	49	.555	Soils

Factor 12

Rank	Row No.	Factor Loading	Activity or Knowledge
1	14	.867	Making and building
2	30	.642	Calibrating

Factor 14

Rank	Row No.	Factor Loading	Activity or Knowledge
1	36	.406	Selecting

Factor 15

Rank	Row No.	Factor Loading	Activity or Knowledge
1	44	.568	Filing

Job Title Cluster 4.
Service - Animal Science Oriented - 8 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	75	.969	Credit
2	76	.969	Insurance
3	77	.969	Taxes
4	50	.969	Soil and water management
5	49	.969	Soils
6	65	.962	Carpentry
7	72	.962	Forestry
8	45	.962	Inventorying
9	3	.962	Selling
10	19	.962	Testing
11	60	.899	Plant diseases
12	70	.878	Agricultural chemicals
13	79	.865	Business principles
14	56	.863	Dairy
15	68	.863	Agricultural economics
16	82	.844	Chemistry
17	42	.832	Writing articles, copy, etc.
18	81	.828	Salesmanship
19	38	.816	Planning
20	44	.763	Filing
21	71	.680	Insect and pest control
22	55	.680	Poultry
23	78	.666	Accounting
24	61	.648	Tractors and other power units
25	46	.625	Making technical reports
26	47	.625	Reading technical reports
27	67	.606	Farm conveniences
28	66	.606	Farm buildings

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Service - Animal Science Oriented - 8 titles, continued

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	21	.980	Conducting research
2	23	.980	Developing techniques
3	62	.918	Electricity
4	86	.915	Research procedures
5	36	.737	Selecting
6	9	.737	Training others
7	10	.737	Appraising work of others
8	11	.737	Supervising others
9	7	.737	Handling men(boss)
10	34	.737	Inspecting,testing, trouble shooting
11	71	.694	Insect and pest control
12	55	.694	Poultry
13	46	.675	Making technical reports
14	47	.675	Reading technical reports
15	24	.662	Planning production or service
16	58	.645	Animal nutrition
17	6	.629	Buying
18	59	.625	Animal diseases
19	39	.559	Promoting

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	27	.994	Repairing
2	29	.994	Assembling
3	30	.994	Calibrating
4	32	.994	Adjusting
5	33	.994	Maintaining
6	35	.994	Installing
7	64	.994	Shop work
8	61	.736	Tractors and other power units
9	7	.651	Handling men(boss)
10	34	.651	Inspecting,testing, trouble shooting
11	9	.651	Training others
12	36	.651	Selecting
13	10	.651	Appraising work of others
14	11	.651	Supervising others

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	74	.928	Rural recreation
2	80	.825	Office procedures
3	28	.781	Operating
4	41	.658	Keeping records and accounts

Factor 5

Rank	Row No.	Factor Loading	Activity or Knowledge
1	43	.966	Making speeches
2	5	.896	Estimating costs
3	63	.671	Farm mechanization
4	4	.632	Advising,consulting and diagnosing

Factor 6

Rank	Row No.	Factor Loading	Activity or Knowledge
1	48	.853	Decision-making
2	51	.756	Crops
3	52	.746	Horticulture

Factor 7

Rank	Row No.	Factor Loading	Activity or Knowledge
1	66	.700	Farm buildings
2	67	.700	Farm conveniences

Factor 8

Rank	Row No.	Factor Loading	Activity or Knowledge
1	2	.623	Meeting non-farm people
2	1	.617	Meeting farm people

Factor 9

Rank	Row No.	Factor Loading	Activity or Knowledge
1	16	.825	Mixing
2	18	.746	Inspecting
3	22	.602	Using technical and service manuals, parts lists

Factor 10

Rank	Row No.	Factor Loading	Activity or Knowledge
1	24	.550	Planning production or service
2	78	.531	Accounting

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Job Title Cluster 5.
Grower-Processor - Plant Science Oriented - 11 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	90	.975	Hydraulics
2	74	.975	Rural recreation
3	88	.932	Mechanics
4	67	.868	Farm conveniences
5	17	.867	Assembling
6	63	.815	Farm mechanization
7	64	.807	Shop work
8	65	.807	Carpentry
9	66	.766	Farm buildings
10	19	.702	Testing
11	87	.702	Electronics
12	35	.679	Installing
13	18	.555	Inspecting
14	60	.552	Plant diseases

Factor 2

1	40	.875	Handling money
2	3	.875	Selling
3	80	.852	Office procedures
4	79	.837	Business principles
5	81	.836	Salesmanship
6	2	.820	Meeting non-farm people
7	39	.744	Promoting
8	45	.667	Inventorying
9	1	.646	Meeting farm people

Factor 3

1	7	.982	Handling men(boss)
2	8	.982	Inducting new personnel
3	10	.982	Appraising work of others
4	11	.982	Supervising others
5	9	.830	Training others

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	70	.895	Agricultural chemicals
2	71	.895	Insect and pest control
3	78	.845	Accounting
4	44	.736	Filing
5	30	.685	Calibrating
6	16	.424	Mixing

Factor 5

1	32	.820	Adjusting
2	27	.712	Repairing
3	28	.636	Operating
4	61	.601	Tractors and other power units
5	30	.478	Calibrating
6	33	.452	Maintaining

Factor 6

1	20	.931	Calculating costs
2	68	.792	Agricultural economics
3	22	.630	Using technical and service manuals, parts lists
4	36	.602	Selecting
5	66	.585	Farm buildings
6	69	.461	General agriculture and rural life knowledge

Factor 7

1	37	.923	Policy-making

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Grower-Processor - Plant Science Oriented - 11 titles, continued

Factor 7, continued

Rank	Row No.	Factor Loading	Activity or Knowledge
2	6	.887	Buying
3	77	.792	Taxes
4	5	.772	Estimating costs
5	76	.710	Insurance
6	36	.660	Selecting
7	16	.609	Mixing

Factor 8

1	49	.891	Soils
2	51	.784	Crops
3	22	.680	Using technical and service manuals, parts lists
4	52	.647	Horticulture
5	57	.596	Feeds
6	75	.586	Credit
7	50	.584	Soil and water management
8	54	.537	Livestock
9	60	.509	Plant diseases
10	48	.500	Decision-making

Factor 9

1	59	.540	Animal diseases
2	58	.418	Animal nutrition

Factor 10

1	42	.935	Writing articles, copy, etc.
2	63	.540	Farm mechanization
3	41	.420	Keeping records and accounts
4	67	.404	Farm conveniences

Factor 11

Rank	Row No.	Factor Loading	Activity or Knowledge
1	62	.742	Electricity
2	73	.641	Food processing
3	55	.624	Poultry

Factor 12

1	35	.621	Installing
2	34	.542	Inspecting, testing, trouble shooting
3	64	.535	Shop work
4	65	.535	Carpentry

Factor 13

1	4	.707	Advising, consulting and diagnosing
2	29	.572	Assembling

Factor 14

1	14	.834	Making and building

Factor 15

1	93	.218	Architecture
2	92	.218	Heat
3	86	.218	Research procedures
4	89	.218	Sound and light
5	91	.218	Metallurgy
6	85	.218	Foreign language
7	84	.218	Advanced mathematics
8	83	.218	Physics
9	82	.218	Chemistry
10	72	.218	Forestry

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Job Title Cluster 6.
Sales - Mechanics Oriented - 1 title

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	20	.967	Calculating costs
2	22	.967	Using technical and service manuals, parts lists
3	23	.967	Developing techniques
4	34	.967	Inspecting, testing, trouble shooting
5	40	.967	Handling money
6	46	.967	Making technical reports
7	51	.642	Crops

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	43	.945	Making speeches
2	3	.945	Selling

Factor 2, continued

Rank	Row No.	Factor Loading	Activity or Knowledge
3	6	.945	Buying
4	1	.945	Meeting farm people

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	2	.891	Meeting non-farm people
2	4	.891	Advising, consulting and diagnosing
3	5	.891	Estimating costs
4	41	.891	Keeping records and accounts
5	47	.891	Reading technical reports
6	48	.758	Decision-making

Job Title Cluster 7.
Sales - Tobacco and Poultry Oriented - 3 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	44	.985	Filing
2	45	.985	Inventorying
3	3	.985	Selling
4	57	.985	Feeds
5	81	.985	Salesmanship
6	32	.939	Adjusting
7	7	.939	Handling men(boss)
8	20	.939	Calculating costs
9	46	.939	Making technical reports
10	51	.939	Crops
11	22	.939	Using technical and service manuals, parts lists
12	27	.939	Repairing
13	39	.939	Promoting
14	58	.939	Animal nutrition
15	59	.939	Animal diseases
16	55	.939	Poultry
17	77	.939	Taxes
18	76	.939	Insurance
19	73	.767	Food processing
20	33	.767	Maintaining
21	28	.767	Operating
22	40	.767	Handling money
23	2	.767	Meeting non-farm people
24	41	.767	Keeping records and accounts

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Sales - Tobacco and Poultry Oriented - 3 titles, continued

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	19	.985	Testing
2	29	.985	Assembling
3	61	.985	Tractors and other power units
4	63	.985	Farm mechanization
5	64	.985	Shop work
6	65	.985	Carpentry
7	67	.985	Farm conveniences
8	69	.985	General agriculture and rural life knowledge
9	88	.985	Mechanics
10	80	.985	Office procedures
11	79	.985	Business principles
12	1	.985	Meeting farm people
13	75	.985	Credit
14	78	.938	Accounting

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	92	.235	Heat
2	90	.235	Hydraulics
3	93	.233	Architecture
4	91	.232	Metallurgy
5	87	.228	Electronics
6	89	.227	Sound and light
7	86	.226	Research procedures
8	85	.222	Foreign language
9	83	.215	Physics
10	84	.213	Advanced mathematics
11	82	.213	Chemistry

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	6	.258	Buying
2	4	.257	Advising, consulting, and diagnosing
3	5	.255	Estimating costs
4	8	.250	Inducting new personnel
5	9	.241	Training others
6	10	.234	Appraising work of others
7	11	.226	Supervising others
8	14	.213	Making and building
9	13	.213	Designing
10	15	.205	Sketching and drawing
11	16	.201	Mixing

Job Title Cluster 8.
Service-Processor - Plant Science Oriented - 6 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	68	.896	Agricultural economics
2	65	.889	Carpentry
3	62	.889	Electricity
4	67	.841	Farm conveniences
5	66	.841	Farm buildings
6	61	.826	Tractors and other power units
7	64	.762	Shop work
8	79	.699	Business principles
9	76	.691	Insurance
10	80	.628	Office procedures
11	77	.627	Taxes
12	69	.623	General agriculture and rural life knowledge
13	63	.611	Farm mechanization
14	75	.586	Credit
15	81	.498	Salesmanship

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Service-Processor - Plant Science Oriented - 6 titles, continued

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	7	.964	Handling men(boss)
2	10	.960	Appraising work of others
3	11	.942	Supervising others
4	18	.902	Inspecting
5	28	.879	Operating
6	16	.807	Mixing
7	9	.780	Training others
8	32	.758	Adjusting
9	48	.725	Decision-making
10	24	.690	Planning production or service
11	19	.647	Testing
12	73	.565	Food processing
13	33	.560	Maintaining
14	46	.539	Making technical reports
15	34	.534	Inspecting,testing, trouble shooting
16	39	.527	Promoting
17	30	.500	Calibrating

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	71	.963	Insect and pest control
2	50	.962	Soil and water management
3	49	.917	Soils
4	52	.872	Horticulture
5	53	.867	Floriculture
6	20	.831	Calculating costs
7	70	.826	Agricultural chemicals
8	60	.770	Plant diseases
9	51	.690	Crops
10	6	.624	Buying
11	38	.611	Planning
12	23	.578	Developing techniques
13	73	.540	Food processing

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	31	.953	Remodeling
2	36	.731	Selecting
3	30	.637	Calibrating
4	37	.578	Policy-making
5	64	.548	Shop work
6	45	.490	Inventorying

Factor 5

Rank	Row No.	Factor Loading	Activity or Knowledge
1	2	.912	Meeting non-farm people
2	1	.857	Meeting farm people
3	44	.705	Filing
4	39	.624	Promoting
5	3	.594	Selling
6	23	.576	Developing techniques
7	47	.524	Reading technical reports

Factor 6

Rank	Row No.	Factor Loading	Activity or Knowledge
1	13	.900	Designing
2	43	.900	Making speeches
3	27	.807	Repairing
4	37	.741	Policy-making
5	29	.671	Assembling
6	34	.493	Inspecting,testing, trouble shooting

Factor 7

Rank	Row No.	Factor Loading	Activity or Knowledge
1	21	.848	Conducting research
2	14	.578	Making and building
3	17	.515	Assembling
4	9	.502	Training others

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Service-Processor - Plant Science Oriented - 6 titles, continued

Factor 8

Rank	Row No.	Factor Loading	Activity or Knowledge
1	84	.820	Advanced mathematics
2	5	.810	Estimating costs
3	78	.733	Accounting
4	38	.641	Planning
5	77	.627	Taxes

Factor 9

Rank	Row No.	Factor Loading	Activity or Knowledge
1	4	.833	Advising,consulting, and diagnosing
2	8	.779	Inducting new personnel
3	88	.779	Mechanics
4	82	.705	Chemistry
5	24	.616	Planning production or service
6	34	.553	Inspecting,testing, trouble shooting
7	36	.551	Selecting
8	63	.545	Farm mechanization

Factor 10

Rank	Row No.	Factor Loading	Activity or Knowledge
1	55	.869	Poultry
2	57	.850	Feeds
3	54	.844	Livestock
4	58	.797	Animal nutrition
5	56	.707	Dairy
6	40	.703	Handling money
7	59	.619	Animal diseases

Factor 11

Rank	Row No.	Factor Loading	Activity or Knowledge
1	72	.813	Forestry

Factor 12

Rank	Row No.	Factor Loading	Activity or Knowledge
1	35	.836	Installing
2	33	.679	Maintaining

Factor 13

Rank	Row No.	Factor Loading	Activity or Knowledge
1	60	.422	Plant diseases

Job Title Cluster 9.
Horticulture Oriented - 2 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	65	.999	Carpentry
2	2	.999	Meeting non-farm people
3	5	.999	Estimating costs
4	14	.999	Making and building
5	15	.999	Sketching and drawing
6	17	.999	Assembling
7	19	.999	Testing
8	22	.999	Using technical and service manuals, parts lists.
9	23	.999	Developing techniques
10	27	.999	Repairing
11	28	.999	Operating
12	33	.999	Keeping records and accounts
14	46	.999	Making technical reports
15	47	.999	Reading technical reports
16	49	.999	Soils
17	50	.999	Soil and water management
18	54	.999	Livestock
19	57	.999	Feeds
20	58	.999	Animal nutrition
21	59	.999	Animal diseases
22	61	.999	Tractors and other power units
23	62	.999	Electricity
24	63	.999	Farm mechanization
25	64	.999	Shop work

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Horticulture Oriented - 2 titles, continued

Factor 1, continued

Rank	Row No.	Factor Loading	Activity or Knowledge
26	1	.999	Meeting farm people
27	66	.999	Farm buildings
28	67	.999	Farm conveniences
29	69	.999	General agriculture and rural life knowledge
30	71	.999	Insect and pest control

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	11	.350	Supervising others
2	13	.286	Designing
3	6	.251	Buying
4	10	.241	Appraising work of others
5	4	.240	Advising,consulting, and diagnosing
6	36	.237	Selecting
7	16	.230	Mixing
8	34	.213	Inspecting,testing trouble shooting
9	35	.211	Installing

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	91	.275	Metallurgy
2	93	.272	Architecture
3	90	.260	Hydraulics
4	88	.254	Mechanics
5	89	.253	Sound and light
6	92	.250	Heat
7	87	.247	Electronics
8	85	.245	Foreign language
9	86	.218	Research procedures
10	84	.216	Advanced mathematics
11	83	.215	Physics
12	82	.200	Chemistry

Factor 4

Rank	Row No.	Factor Loading	Activity or Knowledge
1	29	.314	Assembling
2	25	.300	Constructing equipment tools(hand or power)supplies and instruments
3	51	.239	Crops
4	24	.238	Planning production or service
5	21	.224	Conducting research
6	44	.211	Filing
7	72	.205	Forestry

Job Title Cluster 10.

Building and Construction Oriented - 3 titles

Factor 1

Rank	Row No.	Factor Loading	Activity or Knowledge
1	4	.982	Advising,consulting, and diagnosing
2	5	.982	Estimating costs
3	15	.982	Sketching and drawing
4	18	.982	Inspecting
5	22	.982	Using technical and service manuals, parts lists
6	24	.930	Planning production or service
7	28	.930	Operating
8	34	.930	Inspecting,testing, trouble shooting
9	36	.930	Selecting
10	41	.930	Keeping records and accounts

ACTIVITY AND KNOWLEDGE FACTORS IDENTIFIED FOR EACH OF THE TEN JOB-TITLE CLUSTERS, continued

Building and Construction Oriented - 3 titles, continued

Factor 1, continued

Rank	Row No.	Factor Loading	Activity or Knowledge
11	49	.930	Soils
12	81	.930	Salesmanship
13	93	.930	Architecture
14	20	.918	Calculating costs

Factor 2

Rank	Row No.	Factor Loading	Activity or Knowledge
1	11	.911	Supervising others
2	14	.911	Making and building
3	28	.911	Operating
4	75	.850	Credit
5	79	.850	Business principles
6	88	.850	Mechanics
7	65	.850	Carpentry
8	37	.850	Policy-making
9	80	.822	Office procedures
10	17	.780	Assembling
11	7	.776	Handling men(boss)
12	9	.776	Training others
13	10	.776	Appraising work of others

Factor 2, continued

Rank	Row No.	Factor Loading	Activity or Knowledge
14	69	.776	General agriculture and rural life knowledge
15	66	.770	Farm buildings
16	68	.770	Agricultural economics
17	63	.770	Farm mechanization
18	74	.770	Rural recreation

Factor 3

Rank	Row No.	Factor Loading	Activity or Knowledge
1	13	.999	Designing
2	19	.999	Testing
3	30	.999	Calibrating
4	31	.999	Remodeling
5	32	.999	Adjusting
6	35	.999	Installing
7	2	.893	Meeting non-farm people
8	1	.823	Meeting farm people

APPENDIX K

DICTIONARY OF OCCUPATIONAL TITLES FOR 126 AGRICULTURALLY-ORIENTED JOB TITLES IDENTIFIED IN THE MOREHEAD STATE UNIVERSITY STUDY

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
001	General Director of large farm building construction, farm equipment, sales, and lumber company.	Store Manager(ret. trade) (185.168)
004	General Director of small farm building, farm equipment, and lumber company.	Store Manager(ret. trade) (185.168)
012	General Director of farm machinery and equipment sales, and service company, including automobile and truck sales, and service.	Store Manager(ret. trade) (185.168)
014	Director of Aluminum siding company.	Store Manager(ret. trade) (185.168)
021	Truck driver and yard worker for small farm building, farm equipment, lumber and coal company.	Truck driver, Heavy (any ind)(905.883)
027	Carpenter for lumber and farm building construction company.	Carpenter, construction (860.381)
033	Head mechanic and salesman for farm machinery and equipment company.	Salesman, tractor and farm implements(ret. trade, whlse. trade)(277.358) Farm equipment mechanic (agric.)(624.281)
034	Mechanic for farm machinery automobile and truck company.	Farm equipment mechanic (agric.)(624.281)
035	Mechanic for automobile, tractor, and power unit repair company.	Auto-Tractor mechanic (620.281)
043	Salesman for farm silo construction, lumber, and farm building company.	Salesman, farm and garden supplies(whlse. trade) (277.358)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
044	Salesman for farm machinery, automobile and truck, equipment sales and service, and feed company.	Salesman, tractor and farm implements(ret.&whlse.trade) (277.358) Salesman, grain and feed products(whlse. trade) (262.358)
045	Parts salesman for farm machinery, automobile and truck sales company.	Sales clerk(ret. trade) (290.478) Salesman, tractor and farm implements(ret.&whlse.trade) (277.358)
052	Clerk and bookkeeper for small farm building, farm equipment, and lumber company.	Bookkeeper(clerical) (210.388)
058	Shop foreman for farm building construction, farm equipment, lumber and coal company.	Production foreman(any ind) (699.138) Service Manager(187.168)
060	Service supervisor for farm machinery company.	Manager, Service Dept. (whlse.trade)(187.168)
062	Shop foreman for farm machinery sales and service company.	Manager, Service Dept. (whlse.trade)(187.168)
064	Office manager for farm machinery sales and service company.	Manager, Office(any ind) (169.168)
081	General Director of feed and livestock supply company.	Manager, Store(ret.trade) (185.168)
083	General Director of feed mill, farm supply store, and farm machinery sales and service.	Superintendent, grain elevator(grain & feed mill) (529.138) Manager, Store(ret. trade) (185.168)
084	General Director of grain elevator and farm supply store.	Superintendent, grain elevator(grain & feed mill) (529.138) Manager, Store(ret.trade) (185.168)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
086	General Director and mill operator for feed and farm supply store.	Superintendent, grain elevator(grain & feed mill) (529.138) Manager, Store(ret. trade) (185.168)
087	General Director for feed and coal distribution company.	Manager, Store(ret. trade) (185.168)
092	Millman for feed mill.	Miller, Foreman(grain & feed mill)(521.782)
095	Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.	Truck driver, Heavy (any ind)(905.883)
101	Maintenance man for feed mill and grain elevator.	Millwright(any ind)(638.281)
102	Mechanic for feed mill, farm and dairy supply company.	Maintenance man(any ind) (899.381)
103	Seed cleaning and inspection foreman for seed company.	Foreman, feed mill(grain & feed mill)(529.132)
109	Salesman for feed mill and farm supply store.	Salesman, grain & feed products(whlse.tr.)(262.358) Salesman, tractor and farm implements(ret.tr.)(277.358)
114	Clerk in feed mill and farm supply store.	Sales clerk(ret.tr.) (290.478)
120	Outside foreman for grain elevator, feed mill, farm supply and farm machinery sales company.	Fieldman,(any ind)(180.118) Superintendent, production (agric.)(180.168)
127	Warehouseman for feed mill, farm supply, fertilizer, and lumber company.	Stores laborer,(any ind) (922.887)
137	Director of general farm supply and service company.	Manager, Store(ret. trade) (185.168)

BJT Code	Occupational Title Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
146	General Director of hardware store and feed mill.	Manager, Store(ret. trade) (185.168) Superintendent, grain elevator(grain & feed mill) (529.138)
147	General Director and manager of tobacco warehouse company.	Manager, Tobacco warehouse whlse. tr.)(185.168)
149	General manager real estate company.	Manager, property(real estate)(186.168)
170	Salesman in feed and farm supply store.	Salesman, grain and feed products(whlse.tr.) (262.358) Salesman, farm and garden supplies(whlse.tr.)(277.358)
180	Office worker in tobacco warehouse company.	Clerk, General(clerical) (209.588)
195	General worker in farm supply and service company.	Laborer, Stores(any ind) (922.887)
196	Weighman and general worker in a tobacco warehouse company.	Laborer,Stores(any ind) (922.887) Hogshead weigher(tobacco) (224.487)
206	General Director of vegetable producing company.	Wholesaler(whlse.trade) (185.168)
207	General Director of wholesale vegetable produce and sales company.	Wholesaler(whlse.trade) (185.168)
208	General Director of retail florist shop.	Manager, retail florist (ret. trade)(185.168)
209	General Director of landscaping, florist, and greenhouse business.	Manager, retail florist (ret. trade)(185.168) Nurseryman(agric.) (406.168)
210	General Director of florist and greenhouse business.	Manager, retail florist (ret. trade)(185.168) Nurseryman(agric.) (406.168)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles,Third Edition, 1965
237	Clerk and bookkeeper for nursery and florist shop.	Bookkeeper(clerical) (210.388)
		Sales clerk(ret. trade) (290.478)
263	Floral designer.	Floral designer(ret.trade) (142.081)
264	Deliveryman for retail florist shop.	Deliveryman(any ind) (919.883)
265	Worker in wholesale vegetable produce company.	Production helper(food prep.,NEC)(529.886)
266	Worker for vegetable producing company.	Production helper(food prep.,NEC)(529.886)
267	Worker for landscaping and greenhouse business.	Nursery worker(agric.) (406.887)
276	Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.	Manager, Office(any ind) (169.168)
		Manager, branch(any ind) (183.118)
278	General Director for livestock marketing cooperative.	Supervisor of Sales (bus.ser.)(185.158)
279	General Director of livestock auction company.	Auctioneer(ret. & whlse. trade)(294.258)
		Supervisor of Sales (bus.ser.)(185.158)
282	General Director and distributor for wholesale and retail dairy products, meat and grocery company.	Production Superintendent (any ind)(183.118)
		Manager, Store(185.168)
283	General Director of ice-cream and dairy products company.	Manager, Store(ret. trade) (185.168)
284	Office director of livestock marketing cooperative.	Manager, Office(any ind) (169.168)

DOT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles,Third Edition, 1965
291	Truck driver for livestock marketing and auction company.	Truck driver,Light(any ind) (906.883) Truck driver,Heavy(any ind) (905.883)
292	Truck driver for dairy products, meat, and grocery company.	Truck driver,Heavy(any ind) (905.883)
293	Bottling machine operator for dairy products company.	Dairy processing equipment operator(dariy prod.) (529.782)
301	Freezer inspection man for dairy products company.	Dairy tester(agric.) (469.381)
311	Route salesman for wholesale and retail dairy products, meat, and grocery company.	Salesman,foodstuffs(whlse. trade)(262.358)
312	Waitress of ice-cream dairy bar.	Car hop(Hotel and Rest.) (311.878)
322	Bookkeeper in livestock sales company.	Bookkeeper (clerical) (210.388)
342	Contact man for livestock auction company.	Salesman, livestock (whlse.tr.)(261.258)
343	Yardman for stockyard and feeder cattle business.	Livestock,caretaker,yard-or-in transit(any ind) (466.887)
344	Grader for livestock cooperative.	Grader,meat(slaugh. and meat packing)(525.387)
345	Weighman in livestock sales company.	Weighman (any ind) (525.387)
359	General Director for wholesale and retail egg buying, and grading company.	Production superintendent (any ind)(183.118)
366	Plant process man for poultry processing company.	Poultry dresser(agric., slaugh. and meat pack.) (525.887)
380	Salesman for egg, poultry, poultry processing company.	Salesman, foodstuffs (whlse. tr.)(292.358)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
407	Hatchery operator and breed selection man for poultry company.	Poultry breeder(agric.) (412.181) Manager, hatchery(agric.) (412.168)
410	Truck driver and pick-up man for wholesale-retail egg company.	Truck driver,Light(any ind) (906.883)
411	General worker in egg and poultry processing company.	Farm hand, poultry(agric.) (412.884)
423	General Director for fertilizer, and lime stone company.	Manager,Store(ret. trade) (185.168)
511	General Director of fuel distribution and service company.	Superintendent, pipe lines (184.168)
512	General Director for insurance company.	Manager, Insurance(any ind) (186.118)
513	General Director of hardware, electrical and building supply, paint, and wallpaper company.	Manager, Store(ret. trade) (185.168)
514	General Director or restaurant and liquors store.	Manager, retail liquor (ret. trade)(185.168)
516	General Director of pest control company.	Exterminator supervisor (bus. ser.)(389.138)
517	Service director of pest control company.	Manager, Service Dept. (whlse.tr.)(187.168)
519	General Director of show and riding academy, horse farm and hospital.	General manager, farm (agric.; whlse. trade) (180.168) Superintendent, hospital (med. service)(187.118)
521	General Director of rural grocery and variety store.	Manager, Store(ret.trade) (185.168)
522	General Director of grocery store.	Manager, Store(ret.trade) (185.168)
523	General Director of slaughter and meat processing company.	Production superintendent (any ind)(183.118)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
528	General Director of service station, tractor and truck repair shop.	Garage foreman (auto.ser.) (620.131) Manager, Service(auto.ser.) (185.168)
530	Director, farm management store.	Manager, farm(agric.) (180.168) Manager, Service(auto.ser.) (185.168)
533	Director retail meat and grocery store.	Manager, Store(ret.trade) (185.168)
536	Sales manager for hardware, electrical, plumbing and building supply store.	Manager, Sales(ret.trade & whlse. trade)(185.168)
539	General manager of public utilities and fuel distribution company.	Dispatcher, chief(patrol, production,petrol.,refin., pipelines) I (184.168)
540	General Director of state police district station.	Commanding officer auto. section(gov.ser.)(375.168)
564	Maintenance man in state park.	Park worker(gov. ser.) (407.887)
584	Shipping manager for hardware, building, plumbing, and electrical supply company.	Receiving & shipping foreman(any ind)(223.138)
596	Life insurance agent.	Life underwriter (ins.) (250.258)
597	Salesman in pest control company.	Salesman, pest control company(service)(252.358)
601	Sales manager for insurance company.	Manager, Insurance(any ind) (186.118)
612	Clerk for grocery and variety store.	Stores clerk (223.387)
613	Sales clerk and bookkeeper in retail meat store and meat processing company.	Sales, clerk (ret.trade) (290.478) Bookkeeper(clerical) (210.388)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
614	Clerk in feed mill.	Salesman, grain & feed products(whlse.tr.)(262.358)
616	Cashier in grocery store and bank.	Bank cashier in bank. (186.168) Cashier and wrapper (ret.trade)(211.468)
624	Produce and meat manager in grocery-supermarket.	Supervisor of stock (clerical)(223.138)
631	Route serviceman for pest control company.	Salesman, pest control service(bus.ser.)(252.358)
632	Meat cutter for supermarket.	Meat cutter(ret. & whlse. trade)(316.884)
633	Butcher for frozen food locker and meat processing company, including sausage making and boning.	Butcher(all around-slaugh. and meat pack.)(525.381) Laborer(slaugh. & meat pack.)(529.887)
634	Caretaker in show and riding academy, including horse trainer on horse farm.	Caretaker, farm(agric.) (421.884) Horse trainer(amus.&rec.) II (159.228)
636	Claims adjuster for insurance company.	Claims adjuster(insurance) (241.168)
637	Foreman for horse rehabilitation farm and horse hospital.	Director, hospital (med.ser.)(187,118) Horse trainer(amus.&rec.) I (153.228)
639	Conservation instructor in 4-H camp.	Four-H club agent(education) (096.128)
641	Exercise boy and groom boy for horse rehabilitation farm and horse hospital.	Stableman(any ind)(356.874)
644	Produce man in supermarket-grocery store.	Salesman, food products (ret.trade)(262.358)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
647	Naturalist in State Park.	Park naturalist(gov.ser.) (099.228)
661	General Director for heating and plumbing company.	Manager, Store(ret.trade) I(185.168)
679	General Director or ready mix concrete and concrete block company.	Manager, retail lumber & building supplies(185.168)
681	General Director of garage and service station.	Service manager(auto.ser.) (185.168) Garage foreman(auto.ser.) (620.131)
682	General Director and district distributor in petroleum bulk plant.	Industrial distributor (whlse.tr.)(185.168)
683	General Director of motor company.	Superintendent,transportation(any ind)(184.168) Manager, retail automotive (ret.trade)(185.168)
688	Agent for insurance company.	Agent(insurance)(250.258)
698	General Director for nursing home.	Superintendent, home-for-aged(any ind)(187.118)
770	Service station attendant and automobile mechanic.	Automobile-service mechanic (auto.ser.) I (620.381)
777	Serviceman for furnace company.	Oil burner-installation-and serviceman(any ind) (862.281)
779	Plumber for plumbing company.	Plumber, maintenance (any ind)(862.381)
780	Electrician for plumbing company.	Electrician(any ind) (824.281)
831	Plant foreman for stone and concrete block company.	Concrete batching and mixing plant foreman(constr.) (570.132)
832	Product salesman and office manager for stone company.	Manager, office(any ind) (169.168)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
857	Custodian for public school system, state park, church, hotel, nursing home, and department store.	Janitor(any ind) I (382.884)
865	Cook for camp, school, restaurant, or nursing home.	Cook, head, school cafeteria (hotel and rest.)(313.138) Cook(hotel and rest.) (313.381)
882	Field service worker for health department.	Health officer, field (gov.ser.)(168.168)

APPENDIX L

DICTIONARY OF OCCUPATIONAL TITLES FOR 67 AGRICULTURAL-TECHNICAL JOB TITLES IDENTIFIED IN THE MOREHEAD STATE UNIVERSITY STUDY

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
001	General Director of large farm building construction, farm equipment, sales, and lumber company.	Store manager(ret.trade) (185.168)
004	General Director of small farm building, farm equipment, sales and lumber company.	Store manager(ret.trade) (185.168)
012	General Director of farm machinery and equipment sales and service company, including automobile and truck sales and service.	Store manager(ret.trade) (185.168)
021	Truck driver and yard worker for small farm building, farm equipment, lumber and coal company.	Truck driver,Heavy(any ind) (905.883)
027	Carpenter for lumber and farm building construction company.	Carpenter,constr.(860.381)
033	Head mechanic and salesman for farm machine and equipment company.	Salesman, tractor and farm implements(ret.&whlse.tr.) (277.358) Farm equipment mechanic (agric.)(624.281)
034	Mechanic for farm machinery, automobile and truck company.	Farm equipment mechanic (agric.)(624.281)
035	Mechanic for automobile,tractor and power unit repair company.	Auto-tractor mechanic (620.281)
044	Salesman for farm machinery, autombile and truck,equipment sales and service, and feed company.	Salesman, tractor & farm implements(ret.&whlse.tr.) (277.358) Salesman, grain & feed products(whlse.tr.)(262.358)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
060	Service supervisor for farm machinery company.	Manager, Service Dept. (whlse.tr.)(187.168)
062	Shop foreman for farm machinery sales and service company.	Manager, Service Dept. (whlse.tr.)(187.168)
064	Office manager for farm machinery sales and service company.	Manager, Office(any ind) (169.168)
083	General Director of feed mill, farm supply store, and farm machinery sales and service.	Superintendent, grain elevator(grain&feed mill) (529.138) Manager, Store(ret.trade) (185.168)
086	General Director and mill operator for feed and farm supply store.	Superintendent, grain elevator(grain&feed mill) (529.138) Manager, Store(ret.trade) (185.168)
092	Millman for feed mill.	Miller, foreman(grain and feed mill)(521.782)
095	Truck driver and helper for feed mill, grain elevator, farm implements, fertilizer and livestock supply store.	Truck driver,Heavy(any ind) (905.883)
101	Maintenance man for feed mill and grain elevator.	Millwright(any ind) (638.281)
102	Mechanic for feed mill, farm and dairy supply company.	Maintenance man (any ind) (899.381)
103	Seed cleaning and inspection foreman for seed company.	Foreman, feed mill(grain and feed mill)(529.132)
109	Salesman for a feed mill and farm supply store.	Salesman, grain & feed products(whlse.tr.)(262.358) Salesman, tractor & farm implements(ret.&whlse.tr.) (277.358)
120	Outside foreman for grain elevator, feed mill, farm supply, and farm machine sales company.	Fieldman(any ind)(180.118) Superintendent, production (agric.)(180.168)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
137	Director of general farm supply and service company.	Manager, Store(ret.trade) (185.168)
196	Weighman and general worker in a tobacco warehouse company.	Laborer, stores(any ind) (922.887) Hogshead weigher(tobacco) (224.487)
208	General Director of retail florist shop.	Manager, retail florist (ret. trade)(185.168)
209	General Director of landscaping, florist, and greenhouse business.	Manager, retail florist (ret.trade)(185.168) Nurseryman(agric.)(406.168)
210	General Director of florist and greenhouse business.	Manager, retail florist (ret. trade)(185.168) Nurseryman(agric.)(406.168)
237	Clerk and bookkeeper for nursery and florist shop.	Bookkeeper(clerical)(210.388) Sales clerk(ret.tr.)(290.478)
263	Floral designer.	Floral designer(ret.trade) (142.081)
267	Worker for landscaping greenhouse business.	Nursery worker(agric.) (406.887)
282	General Director and distributor for wholesale and retail dairy products, meat, and grocery company.	Production, superintendent (any ind)(183.118) Manager,Store(185.168)
292	Truck driver for dairy products, meat, and grocery company.	Truck driver,Heavy(any ind) (905.883)
301	Freezer inspection man for dairy products company.	Dairy tester(agric.)(469.381)
343	Yardman for stockyard and feeder cattle business.	Livestock caretaker, yard-or-in transit(any ind) (466.887)
344	Grader for livestock cooperative.	Grader, meat(slaugh.&meat pack.)(525.387)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
359	General Director for wholesale-retail egg-buying and grading company.	Production, superintendent (any ind)(183.118)
380	Salesman for egg, poultry, and poultry processing company.	Salesman, foodstuffs (whlse.tr.)(292.358)
407	Hatchery operator and breed selection man for poultry company.	Poultry breeder(agric.) (412.181) Manager, hatchery(agric.) (412.168)
512	General Director for insurance company.	Manager, insurance(any ind) (186.118)
513	General Director of hardware, electrical and building supply, paint, and wallpaper company.	Manager, Store(ret.trade) (185.168)
516	General Director of pest control company.	Exterminator supervisor (bus.ser.)(389.138)
517	Service director for pest control company.	Manager, Service Dept. (whlse.tr.)(187.168)
519	General Director of show and riding academy, horse farm and hospital.	General manager, farm (agric.;whlse.tr.) (180.168) Superintendent, hospital (med.ser.)(187.168)
522	General Director of grocery store.	Manager, store(ret.trade) (185.168)
523	General Director of slaughter and meat processing company.	Production superintendent (any ind)(183.118)
530	Director, farm management company.	Manager, farm(agric.) (180.168) Manager, service(auto.ser.) (185.168)
533	Director of retail meat and grocery store.	Manager, Store(ret.trade) (185.168)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
536	Sales manager for hardware, electrical, plumbing and building supply store.	Manager, sales(ret.&whlse. trade)(185.168)
539	General manager of public utilities and fuel distribution company.	Dispatcher, chief(petroleum production, petrol. refin., pipe lines) I (185.168)
540	General Director of state police district station.	Commanding officer, auto. ser.(gov.ser.)(375.168)
614	Clerk in feed mill.	Salesman, grain & feed products(whlse.trade) (262.358)
616	Cashier in grocery store and bank.	Bank cashiers in bank (186.168) Cashier and wrapper (ret.trade)(211.468)
624	Produce and meat manager in grocery-supermarket.	Supervisor of stock (clerical)(223.138)
631	Route serviceman for pest control company.	Salesman, pest control serv.(bus.ser.)(252.358)
632	Meat cutter for a supermarket.	Meat cutter(ret. & whlse. trade)(316.884)
633	Butcher for frozen food locker and meat processing company, including sausage making and boning.	Butcher(all-around, slaugh. and meat pack.)(525.381) Laborer(slaugh. & meat pack.)(529.887)
634	Caretaker in show and riding academy, including horse trainer on horse farm.	Caretaker, farm(agric.) (421.884) Horse trainer(amus.&rec.) (II 159.228)
636	Claims adjuster for insurance company.	Claims adjuster(insurance) (241.168)
647	Naturalist in State Park.	Park naturalist(gov.ser.) (099.228)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
661	General Director for heating and plumbing company.	Manager, Store(ret. trade) I(185.168)
681	General Director of garage and service station.	Service manager(auto.ser.) (185.168)
770	Service station attendant and automobile mechanic.	Automobile service mechanic (auto.ser.) I (620.381)
777	Serviceman for furnace company.	Oil burner-installation-and serviceman(any ind) (862.281)
779	Plumber for plumbing company.	Plumber, maintenance (any ind)(862.281)
780	Electrician for plumbing company.	Electrician(any ind) (824.281)
831	Plant foreman for stone and concrete block company.	Concrete batching and mixing plant foreman(constr.) (570.132)
832	Product salesman and office manager for stone company.	Manager, office(any ind) (169.168)
857	Custodian for public school system, state park, church, hotel, nursing home, and department store.	Janitor(any ind) I(382.884)

APPENDIX M

EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHIA

STAFF STUDY

MOREHEAD STATE UNIVERSITY
MOREHEAD, KENTUCKY

Total Population In the 38 County Region of Study*

COUNTY	POPULATION	COUNTY	POPULATION
Bath	9,114	Perry	34,961
Bourbon	18,178	Pike	68,264
Boyd	52,163	Robertson	2,443
Braken	7,422	Rowan	12,808
Breathitt	15,490	Wolfe	6,534
Carter	20,817		
Elliott	6,330	Total Population of the 28 Kentucky Counties----------	505,502
Fleming	10,890		
Floyd	41,642	Adams	19,982
Greenup	29,238	Brown	25,178
Harrison	13,704	Clermont	80,530
Johnson	19,748	Gallia	26,120
Knott	25,258	Highland	29,716
Lawrence	12,134	Jackson	29,372
Lewis	13,115	Lawrence	55,438
Magoffin	11,156	Meigs	22,159
Martin	10,201	Pike	19,380
Mason	18,454	Scioto	84,216
Menifee	4,276		
Montgomery	13,461		
Morgan	11,056	Total Population of the 10 Ohio Counties----------	392,091
Nicholas	6,677		
Pendleton	9,968	Total Population in the Geographical Region	897,593

* Reference, 1960 U.S. Census of Population